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UNITED STATES DEPARTMENT OF AGRICULTURE

DEPARTMENT BULLETIN No. 1409

Washington, D. C. ▼ June, 1926

AGRICULTURAL SURVEY OF SOUTH AMERICA:

ARGENTINA AND PARAGUAY

By

LEON M. ESTABROOK, Agricultural Commissioner
Bureau of Agricultural Economics

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Agricultural Surveys of Foreign Countries

THE BULLETINS of the Agricultural Surveys of Foreign Countries will contain an analysis of the agricultural situation in each country from the viewpoint of the potential demand for agricultural products by those countries whose production is not sufficient to meet their national requirements. The nature and extent of the competition from foreign producers that the farmers of America must meet in disposing of their surplus in foreign markets is thereby indicated. These surveys include a comparison between the pre-war and postwar trends in the agriculture of the countries as affected by the economic conditions, territorial changes, if any, and other factors in each country, brought about by the World War.

The bulletins of this series that have been published are:

Agricultural Survey of Europe: The Danube Basin—Part 1 (Dept. Bul. 1234).

Agricultural Survey of Europe: Germany (Dept. Bul. 1399).

Agricultural Survey of South America: Argentina and Paraguay (Dept. Bul. 1409).

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ARGENTINA[1] AND PARAGUAY

By LEON M. ESTABROOK
Agricultural Commissioner, Bureau of Agricultural Economics

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ARGENTINA

OUR COMPETITIVE AGRICULTURE

Farming is a competitive business, local in the case of highly perishable fruits and vegetables, national and international in the case of products which can be transported, such as bread grains, meats, dairy products, cotton, and wool.

The United States is facing two important problems: (1) An adequate food supply for an ever-increasing population and (2) the utilization of her own agricultural resources and the maintenance of a high standard of living in her farm population in competition with other industries and with agriculture in other countries. The first is a problem of the future and will not become serious so long as agricultural competition with other countries is active. The second is a problem of immediate importance. To the extent that prices of agricultural products in this country are influenced by world supply and demand, the welfare and prosperity of 6,500,000 farm families in this country will be influenced by the surplus agricultural production of countries having cheaper land and cheaper labor. The

[1] The statistics here presented were collected principally in Argentina. The agricultural statistics of the Argentine Government have in some cases undergone revision and the methods of collection are being reorganized. The figures as here given will not always check with previously published official figures.

FIG. 1.—Argentina is wedge-shaped, broad at the north and tapering to a point at the south, extending from 22° to 52° south latitude. This range of latitude coupled with altitude differences gives to Argentina a great variety of climatic and other conditions

problem of maintaining the high purchasing power and the high standard of living of the American farmer in the face of low-cost foreign products and competition is exactly the same as that of the American laborer in the various industries. A realization of this fact has led the United States Department of Agriculture and agricultural leaders generally to pay more attention to the factors of agricultural production in foreign countries and to try to estimate and to forecast the extent of present and probable future agricultural competition.

Table 1 shows the rapid development of wheat exports from the six principal surplus-producing countries in the past 65 years. Particularly significant are the increases in exports from the United States from the close of the Civil War to the end of the nineteenth century and the corresponding increases in exports from the newer agricultural countries—Canada, Australia, and Argentina—from 1890 to the years following the close of the World War.

TABLE 1.—*Wheat, including flour: Exports from the principal exporting countries, five-year average, 1860–1924, and for fiscal year 1925*

(In thousands—000 omitted)

Years	Year ended June 30			Year ended March 31	Year ended December 31	
	United States [1]	Canada	Australia [2]	British India	Argentina	Russia [3]
Average:	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*
1860–64	46, 270	----------	----------	[4] 583	----------	----------
1865–69	21, 665	----------	----------	[5] 485	----------	[6] 46, 125
1870–74	57, 799	[5] 5, 922	----------	1, 162	----------	58, 499
1875–79	89, 470	6, 605	----------	6, 198	[5] 326	73, 134
1880–84	150, 174	5, 541	----------	24, 261	1, 386	64, 837
1885–89	117, 833	4, 170	----------	34, 358	4, 068	98, 111
1890–94	159, 495	7, 426	----------	33, 241	29, 178	99, 237
1895–99	171, 261	13, 760	----------	16, 763	31, 829	118, 256
1900–04	192, 099	25, 757	[5] 19, 071	21, 492	58, 312	121, 620
1905–09	113, 147	43, 455	32, 897	38, 553	108, 886	131, 735
1910–14	104, 967	94, 286	53, 043	51, 883	83, 475	141, 824
1915–19	239, 827	158, 766	43, 516	33, 289	97, 248	[4] 13, 509
1920–24	248, 740	213, 221	88, 692	12, 355	142, 901	[7] 23, 192
Year ended June 30, 1925	258, 023	194, 841	117, 055	44, 145	126, 094	328

[1] Prior to July, 1880, wheat flour converted to grain on the basis that 1 barrel of flour equals the product of 5 bushels of wheat. Beginning July, 1880, flour converted to grain with basis that 1 barrel flour equals the product of 4½ bushels of wheat.
[2] Year ending December 31 previous to 1915.
[3] Three-year average.
[4] Two-year average.
[5] Four-year average.
[6] Russia in Europe only prior to 1883. Includes rye flour prior to 1883.
[7] 1924 only.

Compiled from: United States—1860–1918—Foreign Commerce and Navigation of the United States, 1860–1918. 1918–1925—Monthly Summary of Foreign Commerce of the United States, June issues, 1919, 1925. Canada—1870–1889—Trade and Commerce, 1900, pp. 440–443. 1890–1925—Monthly Report of Trade of Canada, March issues, 1890–1925. Australia—1901–1910—Official Yearbook of Australia, 1901–1910, p. 371. 1911–1924—Australian Statistics of Oversea Imports and Exports and Customs and Excise Revenue. British India—1863–1872—Statistical Abstract Relating to British India from 1862–1871. 1873–1881—Monthly Summary of Commerce and Finance of the United States, January–June, 1898, p. 1438. 1882–1896—World's Markets for American Products, Bul. 508, Cir. 5–11, p. 6. 1897–1925—Trade by Land of British India with Foreign Countries, March issues, 1897–1925—and Sea-bourne Trade of British India with the British Empire and Foreign Countries, March issues, 1897–1925. Argentina, 1876–1879—Senate Ex. Doc. No. 91, 53d Congress, 2d session, pp. 35 and 36. 1880–1890—World's Markets for American Products, Buls. 5–8, Cirs. 5–11, p. 5. 1891–1906—Argentine Yearbook, 1914, p. 227. 1907–1914—Anuario de la Direccion General de Estadistica. 1915–1923—Annuario del Comercio Exterior, 1915–1923. 1924—Estadistica Agro-Pecuaria-Boletin Mensual de December, 1924. Russia—1876–1879—Senate Ex. Doc. No. 91, 53d Congress, 2d session, p. 12–14. 1871–1882—Monthly Summary of Finance and Commerce, United States, January–June, 1898, p. 1428. 1883–1906—U. S. Dept. Agr. Bul. No. 69, European Grain Grade, p. 48. 1906–1916—Reports of Foreign Trade of Russia over European and Asiatic Frontiers. 1924 and 1925—Broomhalls' Corn Trade News.

NEED FOR UNDERSTANDING CONDITIONS IN SOUTH AMERICA

Few Americans realize that Brazil is larger than continental United States and has climates, soils, and natural resources almost as varied; that Argentina, Uruguay, and Paraguay have large areas of rich, virgin prairie soils in a temperate climate not yet brought under cultivation; that in Argentina a vigorous white race is developing under conditions similar to those which prevailed in the United States west of the Mississippi River 30 years or more ago; that Argentina is already competing with the United States in the world markets with her cheap corn, wheat, flaxseed, meats, wool, and dairy products; that in northern Argentina, Paraguay, and southern Brazil it is possible that a cotton-growing industry will eventually develop equal to that of the United States; that these countries produce grapes, citrus, and other fruits of the finest quality which lack only transportation facilities and organization to compete with those of the United States; that great modern cities and industries are springing up and developing rapidly; that the people of these countries are as proud of their history and of their progress as are the people of the United States; and that just as the history of civilization and progress has been much the same during the last four centuries in all countries of North and South America and their interests have been and are much the same, so we may expect that in the future much of the marvelous development that has taken place in the United States during the last half century will, to a considerable extent, be duplicated in the temperate regions of South America.

POSITION AND SIZE OF ARGENTINA[2]

Argentina is wedge-shaped, broad at the north and tapering to a point at the south. It extends from 22° to 55° south latitude, a difference of 33°, or more than 2,000 miles north and south; and from 56° to 73° of longitude west from Greenwich, a difference of 17°, or about 1,000 miles in the widest part at the north, and tapering to a width of about 150 miles in the extreme south. The position of the sun, the occurrence of the seasons, and the climate are just the reverse of those in the Northern Hemisphere. The southermost limit of Tierra del Fuego is in the same latitude in the Southern Hemisphere as the middle of Labrador, Hudson Bay, Lake Winnipeg, the middle of British Columbia, the southern part of Alaska, and the middle of Bering Sea in the Northern Hemisphere. The northern limit of Argentina south of the Equator corresponds with the parallel of latitude north of the Equator which runs north of the island of Haiti, through the middle of Cuba, skirts the northern border of Yucatan, and crosses the southern part of Mexico.

Argentina is separated from Chile on the west by a frontier more than 2,500 miles long, mostly in the Andes Mountains, and to the east from the mouth of the La Plata River to the southern extremity of Tierra del Fuego it has a sea-coast line of approximately 2,600 miles.

The area of Argentina is approximately 1,153,000 square miles. It is therefore a little more than one-half the size of the United States

[2] The correct Spanish pronunciation of Argentina is "Ar-ken-teena"; the "*g*" is sounded like a "*k*" and the "*i*" like "*ee*" with the accent on the "*i*."

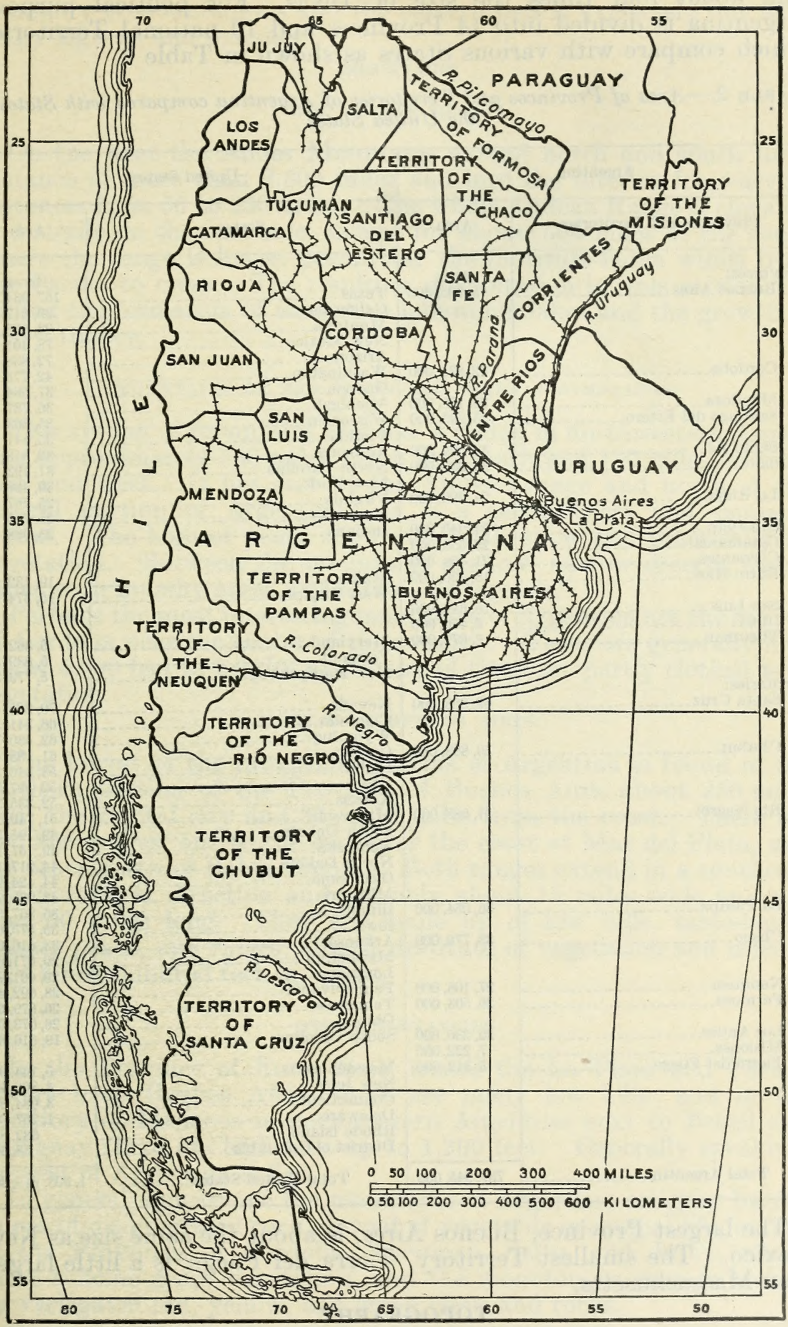

FIG. 2—The provinces and territories of Argentina

and about four times the size of Texas. For political purposes Argentina is divided into 14 Provinces and 10 national Territories, which compare with various States as shown in Table 2.

TABLE 2.—*Area of Provinces and Territories of Argentina compared with States of the United States*

Argentina		United States	
Provinces and Territories	Area	States	Area
Provinces:	*Acres*		*Acres*
Buenos Aires	75,395,000	Texas	167,934,720
		California	99,617,280
		Montana	93,523,840
		New Mexico	78,401,920
		Arizona	72,838,400
Cordoba	42,835,000	Washington	42,775,040
		Georgia	37,584,000
Mendoza	36,170,000	Michigan	36,787,200
Santiago del Estero	35,995,000	Wisconsin	35,363,840
		Florida	35,111,040
Santa Fe	32,594,000	Alabama	32,818,560
Salta	30,921,000	North Carolina	31,193,600
		New York	30,498,560
La Rioja	24,290,000	Virginia	25,767,680
		Kentucky	25,715,840
San Juan	24,240,000	Indiana	23,068,800
Catamarca	23,558,000		
Corrientes	21,468,000		
Entre Rios	18,720,000	Maine	19,132,800
		West Virginia	15,374,080
San Luis	18,648,000		
Jujuy	9,476,000		
Tucuman	6,672,000	Maryland	6,362,240
		Vermont	5,839,360
		New Hampshire	5,779,840
Territories:			
Santa Cruz	69,868,000	Nevada	70,285,440
		Colorado	66,341,120
		Wyoming	62,430,720
Chubut	59,808,000	Oregon	61,188,480
		Idaho	53,346,560
		Utah	52,597,760
		Kansas	52,335,360
Rio Negro	51,088,000	Minnesota	51,749,120
		South Dakota	49,195,520
		Nebraska	49,157,120
		North Dakota	44,917,120
		Oklahoma	44,424,960
		Missouri	43,985,280
La Pampa	36,054,000	Illinois	35,867,520
		Iowa	35,575,040
Chaco	33,770,000	Arkansas	33,616,000
		Mississippi	29,671,680
		Louisiana	29,061,760
Neuquen	27,108,000	Pennsylvania	28,692,480
Formosa	26,503,000	Tennessee	26,679,680
		Ohio	26,073,600
Los Andes	20,230,000	South Carolina	19,516,800
Misiones	7,222,000		
Tierra del Fuego	5,312,000	Massachusetts	5,144,960
		New Jersey	4,808,960
		Connecticut	3,084,800
		Delaware	1,257,600
		Rhode Island	682,880
		District of Columbia	38,400
Total Argentina	737,945,000	Total United States	1,903,215,360

The largest Province, Buenos Aires, is about the same size as New Mexico. The smallest Territory, Tierra del Fuego, is a little larger than Massachusetts.

TOPOGRAPHY

Generally it may be said that Argentina slopes from an altitude of 20,000 feet in the Andes on the west and northwest to sea level in a southeasterly direction. The northwestern third and the western

boundary is mountainous and the eastern half is extremely flat with many lagoons and marshes.

MOUNTAINS

THE ANDEAN REGION

On the west the Andes Mountains extend north and south for a distance of more than 2,500 miles and into the interior for varying distances from 50 to 250 miles. The whole Andean Range is elevated and sterile on the east side, except for about 500 miles at the south where the range is lower, permitting the moisture-laden winds from the Pacific to cross. The resulting precipitation in this section has caused the formation of numerous mountain lakes and the growth of heavy timber.

MOUNTAINS OF THE PAMPA (LAS SIERRAS PAMPEANAS)

This system of mountains occupies a region in northwestern Argentina approximately 350 miles north and south and 100 miles or more east and west. It lies east of the Andean range and north of the central portion of Argentina. It is a semitropical and semiarid region. The highest peaks show very little snow and practically no vegetation. Between the mountains are low, narrow deserts, sometimes with marshy areas and a few salt lagoons.

Perhaps the most interesting mountains of Argentina are the Sierras of Cordoba near the center of the country. These are generally low, below 5,000 feet in height, and many of them are partly clothed with vegetation.

SIERRAS DE BUENOS AIRES

The lowest of the mountain systems of Argentina is found in the southern portion of the Province of Buenos Aires about 250 miles from the capital city and 30 to 50 miles from the coast. There are two low ranges, one to the east near the coast at Mar del Plata, and the other north of Bahia Blanca. Both ranges extend in a southeast and northwest direction and are only about 15 miles wide and not over 50 miles long. They are made up of low hills, table-lands, granite peaks, and ridges, almost destitute of vegetation and usually only a few hundred feet in height.

OTHER ELEVATIONS

In the Province of Entre Rios, across the La Plata and Parana Rivers from Buenos Aires, there are many low hills; and in the Territory of Misiones in northeastern Argentina next to Brazil and Paraguay there are high hills up to 1,200 feet. Generally speaking, the rest of Argentina is flat.

In general appearance the mountains of Argentina are gray barren slopes of disintegrated rock, devoid of vegetable or animal life, except in the Provinces of Cordoba, Tucuman, Salta, and Jujuy, where there is some green vegetation, and the monotonous gray is broken by variegated red, yellow, and green clays and rocks.

RIVERS

Argentina is unique in its rivers. It has some of the largest and longest navigable rivers in the world and at the same time it has numerous rivers without any outlet to the sea that sink into the earth and disappear. Except in the mountains, the rivers, like those of the southern portion of the United States, are generally impregnated with fine silt and are muddy. Many of the streams and rivers that do not reach the sea, end in lagoons or swamps, leaving a deposit of fine mud that dries up in summer and is distributed by the wind. The heavier material, loose sand, is blown up in great moving sand dunes.

The principal river of Argentina and one of the great rivers of the world is La Plata, or "silver river." It is formed by the junction of the Parana and the Uruguay Rivers, about 25 miles above the city of Buenos Aires. It is shallow, and is navigated by ocean-going ships through a narrow canal, which must be kept clear by constant dredging. The tides are low and the coast lines are flat. The greatest changes in level and depth are caused by prevailing winds.

THE PARANA AND ITS TRIBUTARIES

The Parana is one of the two principal tributaries of the La Plata. It rises in the mountains of southeastern Brazil, 600 miles or more northeast of the Argentine frontier, where it is joined by the Iguazu. Some 6 or 8 miles above the junction of these two rivers are the celebrated falls of the Iguazu, which rank among the highest and largest in the world. The total length of the Parana River from its source to the La Plata is approximately 1,425 miles, disregarding numerous curves. In general appearance it is similar to the Mississippi. It is several miles wide for a distance of about 500 miles in its lower course and is navigable by ocean-going steamers half that distance. For boats of smaller draft, it is navigable for more than 1,000 miles.

The principal tributary of the Parana is the Paraguay River, which rises in the south central part of Brazil and flows south to join the Parana, an airline distance of approximately 1,550 miles.

The Parana and Paraguay Rivers have furnished the principal means of communication with the sea and the outer world for south central Brazil, Paraguay, and a large portion of the Argentine interior since the days of the early Spanish settlements. They still form the principal trade route, as there is only one railroad line from Asuncion to Buenos Aires. Rosario, on the Parana River 250 miles north of Buenos Aires, ranks second in size as a city and as a port for the export of cereals and other products to Europe.

The delta of the Parana is formed by islands, channels, and canals, and is about 120 miles long by 30 miles wide at its mouth. It is subject to inundations one or more times a year and the soil is exceedingly fertile. Large quantities of fresh vegetables, peaches, quinces, plums, grapes, oranges, and tangerines are grown for the Buenos Aires market, and many of the islands are covered with a dense growth of planted Lombardy poplars, that are used for making fruit and vegetable crates and for fuel.

The second great tributary of the La Plata is the Uruguay River, which forms the eastern boundary between Argentina and Uruguay

and a portion of southern Brazil. It is about 800 miles long in an air line, is navigable for several hundred miles, and furnishes a water route for both eastern Argentina and western Uruguay.

The majestic river system of La Plata and its tributaries drain the northern half of Argentina, the southern half of Bolivia, the southern third of Brazil, all of Paraguay, and the western half of Uruguay, a territory more than 600 miles wide and 1,200 miles long, containing about 720,000 square miles. This great region is nearly equal to the whole of the United States east of the Mississippi River (856,120 square miles). It is larger than the combined areas of France, Germany, Spain, and Italy (716,516 square miles). The Parana is very near to 10 miles wide. From Buenos Aires to Rosario, a distance of about 250 miles, it is navigable for ocean-going steamers drawing about 21 feet at low water; from Rosario to Santa Fe, a distance of 75 miles, by boats drawing 19 feet; and for smaller boats it is navigable to Posada, a further distance of 450 miles, or to Concepcion, about 550 miles. The Pilcomayo and Bermejo are navigable by small boats for several hundred miles at certain seasons. The Uruguay is navigable for ocean steamers as high up as Concordia, about 180 miles from its mouth, and by smaller boats 150 miles farther.

South of Buenos Aires is the curious river of Salado, which rises in the central Province of Cordoba and seeps its way through marshy spaces in the Pampa to the ocean, more than 400 miles southeast. At very few points in its course would it be recognized as a river or stream. It has no perceptible current and is really a succession of reed-grown lagoons and marshes, inhabited by countless numbers of water fowl. It varies in width according to the season and rainfall from a few hundred feet to several miles. It meanders through a prairie region of great fertility and probably the time will come when it will be economic to provide artificial drainage.

Except for the Rio Salado, there are no rivers that reach the sea south of the La Plata until the Rio Colorado is reached, about 100 miles south of Bahia Blanca, and still farther south is the Rio Negro. Neither of these rivers is navigable. Both flow through semidesert regions and the quantity of water discharged varies greatly with the season. A railroad and irrigation works have been constructed along the Rio Negro, and fruit growing and alfalfa, especially for seed, have developed rapidly.

LAKES

The most important and picturesque lakes of Argentina are situated in the Andes Mountains west of Patagonia. There are 50 or more of these Andean lakes, generally narrow, relatively long and deep, with clear blue or green water, lying between high mountains with heavily wooded slopes. Their total combined area is approximately 1,500 square miles. The largest of these lakes are Nahuel Huapi, San Martin, Viedma, Argentino, Ftalauquen, Buenos Aires, General Paz, La Plata, and Fontana. Most of them are from 1,000 to 3,000 feet above sea level and lie in an east to west, or northwest to southeast direction.

LAGOONS

The eastern half of the Province of Buenos Aires is dotted with shallow lagoons, many of them impregnated with salt, and there are millions of acres of rich virgin land rendered unfit for cultivation by standing water only a few inches in depth or by inundations that follow heavy rains. This accounts for the fact that the eastern half of the Province of Buenos Aires is so largely devoted to pastures for livestock, although the soil is fertile and there is abundant railway transportation to nearby ports. Among the larger lagoons is Mar Chiquita, in the Province of Cordoba, and to the north is another area of about 250 square miles covered with lagoons and swamps.

Another large area, 100 miles long by 50 miles wide, lies near the Saladillo River, between the cities of Santiago del Estero and Salavina. The lagoon Llancanalo, south of the River Atuel in Mendoza and La Pampa, is nearly 40 miles long by 10 or more miles wide. The lagoon Bebedero in San Luis, is really a marsh about 25 miles long by 18 miles wide, which sometimes almost dries up. It has solid deposits of salts, principally sulphate of soda, potassium, and magnesia. These salts are mined at certain seasons, with a production of about 5,000 tons per month.

The largest alkali region of Argentina is found in Las Salinas Grandes, between the mountains of Cordoba and those of Catamarca, a region which covers about 7,000 square miles. This depression is only about 150 feet above sea level and is surrounded on all sides by higher elevations. It is a sterile, arid, desert region, covered with shallow water at rare intervals, which quickly evaporates leaving the soil covered with a coating of alkali.

In the northwestern part of the Province of Corrientes, a short distance east of the Parana River and approximately 350 miles north of the city of Buenos Aires in an air line, is the Gran Laguna del Iberá. In places this lagoon is nearly 100 miles north and south and the same distance east and west, so that it probably covers about 10,000 square miles. This great lagoon has never been thoroughly explored. It is in a semitropical region with a heavy annual rainfall, and the lagoon is full of floating islands and dense vegetation.

UNDERGROUND WATER

One of the problems of a large part of Argentina is that of obtaining pure water free from excessive quantities of salts and suitable for drinking purposes for man and beast. The first deep well was dug in Buenos Aires in 1861 to a depth of 958 feet. A few years later another deep well was dug near Beazley and water was not encountered before reaching a depth of more than 3,000 feet. Through a large portion of the Pampa country good water is generally found at depths of from 100 to 500 feet, and often much nearer to the surface. Practically every house in the country towns of the Pampa region has its own well and windmill, and the large estates have a well, windmill, and tank for each subdivision of the estate. In portions of Chaco and Santiago del Estero to the north it is necessary to bring water in by train for use in the locomotives, for the population of the towns, and for the sawmills and other enterprises that use steam engines as a motive power. In the Provinces east of the Parana, where the geological formation is different from that of the Pampa,

and in a strip 100 miles or more wide west of the Parana, an abundant supply of subsoil water is found near the surface.

NATURAL REGIONS

There are four characteristic regions of considerable extent and importance in Argentina.

THE PAMPA

The Pampa of Argentina is a region similar to portions of the Great Plains country west of the Mississippi, especially portions of Texas, Oklahoma, and Kansas. It includes all of the Province of Buenos Aires and the Territory of La Pampa, and portions of Santa Fe, Cordoba, San Luis, Mendoza and Neuquen. It is an immense region and is so nearly flat that only rarely can any sign of an elevation or depression in the surface be detected, and so smooth that for hundreds of miles there is no break in the surface by gully, creek, brook, or river. The surface is covered with native grasses and weeds, alfalfa pastures, or grainfields. The atmosphere is usually clear. The Pampa extends from the eastern coast westward to the Andes, a distance of 600 miles, and from the Rio Negro northward to the mountains of Cordoba and the timber line in northern Santa Fe, a distance of approximately 500 miles. The only trees seen in this region are a few native trees along the Parana River, calden woods in the western part of the Territory of La Pampa, native trees near the mountains of Cordoba, and groves of trees that have been planted about the farm and ranch houses and buildings. The western portion of the Pampa is semiarid, but the eastern half has ample rainfall and constitutes the great pastoral and cereal belt of Argentina, in which approximately 80 per cent of the crops and livestock of the Republic are produced. It is the most important region in Argentina and is dotted with cities and towns and covered with a network of railways.

MEDITERRANEAN

This region is almost entirely surrounded by rivers—La Plata on the south, the Parana on the west, the Uruguay on the east, and the Upper Parana on the north. It comprises the Provinces of Entre Rios and Corrientes and the Territory of Misiones. It is different from the flat Pampa and Chaco country, from which it is separated by the Parana River, in that it has an undulating, rolling surface with many small streams, often with a narrow belt of trees on both sides, and in general appearance it is like portions of Texas and Oklahoma. It has more rain than the Pampa and generally the soils are less fertile. The southern half has a climate similar to that of the Pampa, but the northern portion is subtropical like the Chaco. It produces about 10 per cent of the grain and flaxseed of the Republic, but the principal industry is livestock raising. Considerable quantities of tobacco, peanuts, and citrus fruits are grown, especially in the north, and in the east-central portion near Concordia is a flourishing fruit industry, especially grapes and citrus fruits. Cotton is beginning to be grown in the north. This region is not so well populated or so well provided with railways as the Pampa and there is great room for agricultural development.

EL CHACO

The Chaco or "Gran Chaco" is an extension of the Pampa region with the distinguishing feature that its surface is covered with alternating belts of woods and prairie. It begins about 100 miles north of the city of Santa Fe near parallel of latitude 30° South, and extends northward through Paraguay into Bolivia and Brazil, a distance of about 900 miles. Its width is from 200 to 400 miles. About half of the Gran Chaco is in the northern part of Argentina. It is a flat, level region of low elevation, similar to the Pampa, with a semitropical climate, humid in the east and semiarid in the west. A large portion of the Chaco is covered with alternating belts of woods, prairie, and swamps. There are large areas of prairie with a scattering growth of palm trees called "palmeros," the trunks of which are used for telegraph and telephone poles and fence posts. Sometimes they are split and hollowed for use as tiles on roofs of houses. The principal industries in the past have been the raising of long-horned native cattle on the prairies and exploiting the Quebracho colorado. Quebracho is equal to the best coal for fuel, and large quantities have been so used, also enormous quantities have been exported for tannin either in the form of logs or extract made from the logs. The trees attain considerable size. The larger quebracho trees are usually isolated and not more than 10 or 20 are found growing on an acre. Along with them are found various species of acacia trees, somewhat similar to the honey locust of the United States. Underneath the quebracho and acacia trees there is usually an impenetrable thicket of thorny bushes and shrubs up to 15 feet in height, interspersed with many giant cacti.

Because of the flatness of the surface there are many swamps, and the absence of streams or channels to carry off the surface water is noticeable. In the western portion of the Chaco, which includes most of the Province of Santiago del Estero, semiarid conditions prevail, trees and shrubs are smaller and more scattering, and large areas of almost solid stands of giant cacti are found.

Portions of this region are not yet well explored, and the population is confined to small settlements along the rivers and railroads. As a general rule the land belongs to the National Government or is held in large tracts by private owners. The public lands are open to settlement after they have been surveyed by the Government, but in 1924 only a small portion had been surveyed. Among the large private holdings may be mentioned one of 556,000 acres and another of 1,850,000 acres. For many years this property produced more than 60,000 tons of quebracho annually. The records of the Argentine Land Office show that although large areas of public land remain most of it lies at a distance of 20 miles or more from rivers and railroads. It is in the Chaco region that most of the development in cotton growing is taking place.

MOUNTAINS

The mountainous region includes the Andes Mountains and the northwestern quarter of Argentina north of the Pampa and west of the Chaco, about 150 miles east and west by 400 miles north and south. It includes a portion of Cordoba, all of Tucuman, Salta, Jujuy, Los Andes, Catamarca, and La Rioja, and portions of San

Luis and San Juan. It includes many high elevations, is generally semiarid in character, has many inaccessible areas, deserts, alkali swamps, and generally a subtropical climate. Sugar cane, rice, tobacco, and fruits are grown under irrigation in Tucuman and northward, and wine grapes in San Juan and other limited sections. Most of the goats, burros, and mules of the Republic are found in this region. Agricultural development is limited by irrigation facilities, distance to markets, and high freight rates. It is, however, a region of great undeveloped mineral resources.

PATAGONIA

Patagonia is a regional name given to all that part of Argentina south of Rio Colorado, which is about 100 miles south of Bahia Blanca. It is triangular in shape, about 1,000 miles north and south, 450 miles wide at the north, and ends with the Argentine portion of Tierra del Fuego on the south. Except for the narrow strip of irrigated land along the Rio Negro and the wooded region of the south, it is generally semiarid and suitable only for raising sheep and wool.

CLIMATE

Argentina, extending north and south through 33 degrees of latitude, equivalent to the distance between Labrador and Cuba, with altitudes ranging from sea level to more than 20,000 feet, has all kinds of climate—tropical in the north and cold in the south, humid in the extreme east and semiarid in the west. At the city of Buenos Aires near the ocean and about half way between the northern and southern limits of the country ice rarely forms, and citrus fruits, roses, and other tender plants continue to grow and bloom during the winter months. In the north, bananas, coffee, sugar cane, and cotton grow, citrus fruits extend as far south as the central portion of the Republic, and in the extreme south only grass and the hardy trees, shrubs, and plants survive the long, severe winters.

Because of the great extension of flat, level, unobstructed areas to the east between the Antarctic Zone to the south and the Tropics to the north, the climate is characterized by the suddenness of its changes. The temperature depends mainly upon the direction of the wind. When the wind comes from the Tropics across the unobstructed Chaco and Pampa country the weather is warm in winter and excessively hot in summer. There are also extremes with respect to rainfall. Argentina has its dry and its wet years. It has happened several times that more rain has fallen in a single month of a wet year than during the entire 12 months of a dry year. Sometimes rains are very heavy but of short duration, so that a few hours' rain may inundate considerable areas of flat country.

The longest continuous series of weather observations are for the city of Buenos Aires since 1857, Tucuman since 1868, Mendoza, San Juan and Cordoba since 1871, Rosario and Salta since 1881. The great majority of weather stations in Argentina are less than 25 years old.

TEMPERATURE

Because of the difference in altitude, the isotherms, or lines of equal temperature, do not run straight across the country from east to west but describe great curves. Practically all the isotherms run nearly

west across the flat country until they reach the Andes and then turn due north or northeast. The annual mean temperature of the entire country is 58° F. The 68° line corresponds roughly with the thirtieth parallel of latitude, running nearly due west in the northern third of the country until it reaches the mountainous region in the northwest where it turns at right angles and runs east of north to Bolivia. (See fig. 3.)

WINDS

With respect to winds, Argentina may be divided into two great regions with the forty-second parallel of latitude as a dividing line, crossing the northern part of Patagonia near the boundary between the Territories of Rio Negro and Chubut. South of this line the winds blow steadily from the west over and through the deep passes of the Andes. North of this line the winds are variable, but generally from the east or north. Winds from the south and southwest, which often come with great suddenness, are called "Pamperos" and usually the temperture falls rapidly. The pamperos come with great velocity and are accompanied by turbulent-looking clouds and violent electrical discharges. Just before a pampero the weather is usually oppressive, and following the pampero it is usually clear and very agreeable for several days. There are occasional winds of hurricane force which blow off roofs and uproot trees. The effect of strong east or southwest winds in changing the level of the La Plata River has been mentioned. Apparently little or no damage is caused by the violent electrical discharges that accompany the pamperos.

RAINFALL

Rainfall in the extreme north of the Republic in summer is subtropical averaging about 16 inches. In the far south and along the South Andes the rainfall is heavy from the condensation of the moisture brought by the west winds which cross the Andes without losing as much of their moisture as they do farther north. Rainfall ranges from 20 to 55 inches annually. The zones of heavy, light, and scant rainfall generally run nearly north and south. (See fig. 4.) The line of 40-inch average rainfall begins north of the city of Buenos Aires and runs west of north to the western part of Paraguay. The triangular area to the east of this line is probably 300 miles across in the widest place and 600 miles long. The rainfall becomes heavier east of this line until in the Territory of Misiones in the extreme northeast it is about 70 inches. The line of 20-inch average rainfall is from 250 to 350 miles west of the 40-inch zone and includes the great cereal region of Argentina in which more than 90 per cent of the total agricultural production of the country is found. The line of 10-inch rainfall is from 50 to 150 miles west of the 20-inch zone and runs slightly west of north. To the west of this is the semiarid zone with less than 10 inches, which is about 200 miles wide and 2,000 miles long. Farther south and west in Patagonia the rainfall becomes heavier up to 20 or more inches. In the north-central portion of Argentina there is a small area in Tucuman, perhaps 50 by 100 miles, with an average rainfall of 40 inches, and another small area farther north in Jujuy with an average rainfall of 25 to 30 inches.

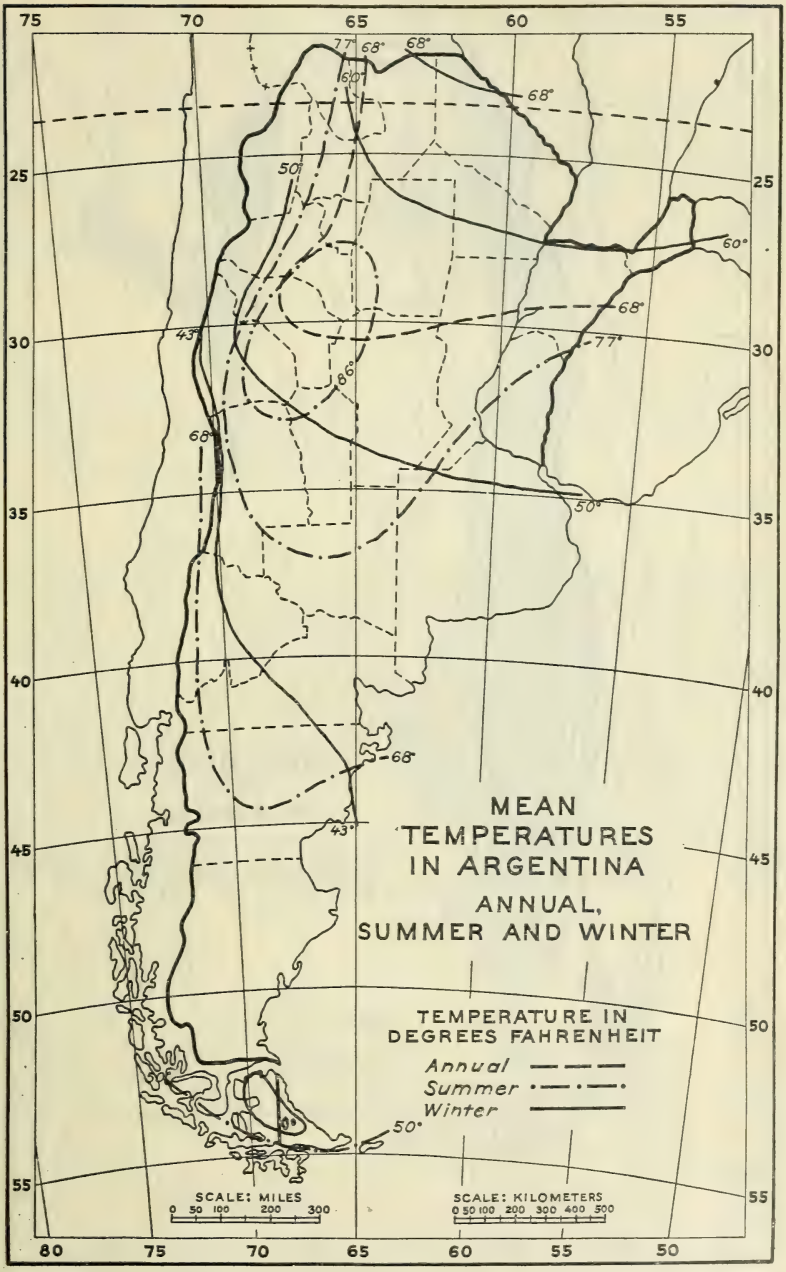

FIG. 3.—Argentina, extending through 33° of latitude, with altitudes ranging from sea level to more than 20,000 feet, has a temperature ranging from that of Labrador to that of Cuba

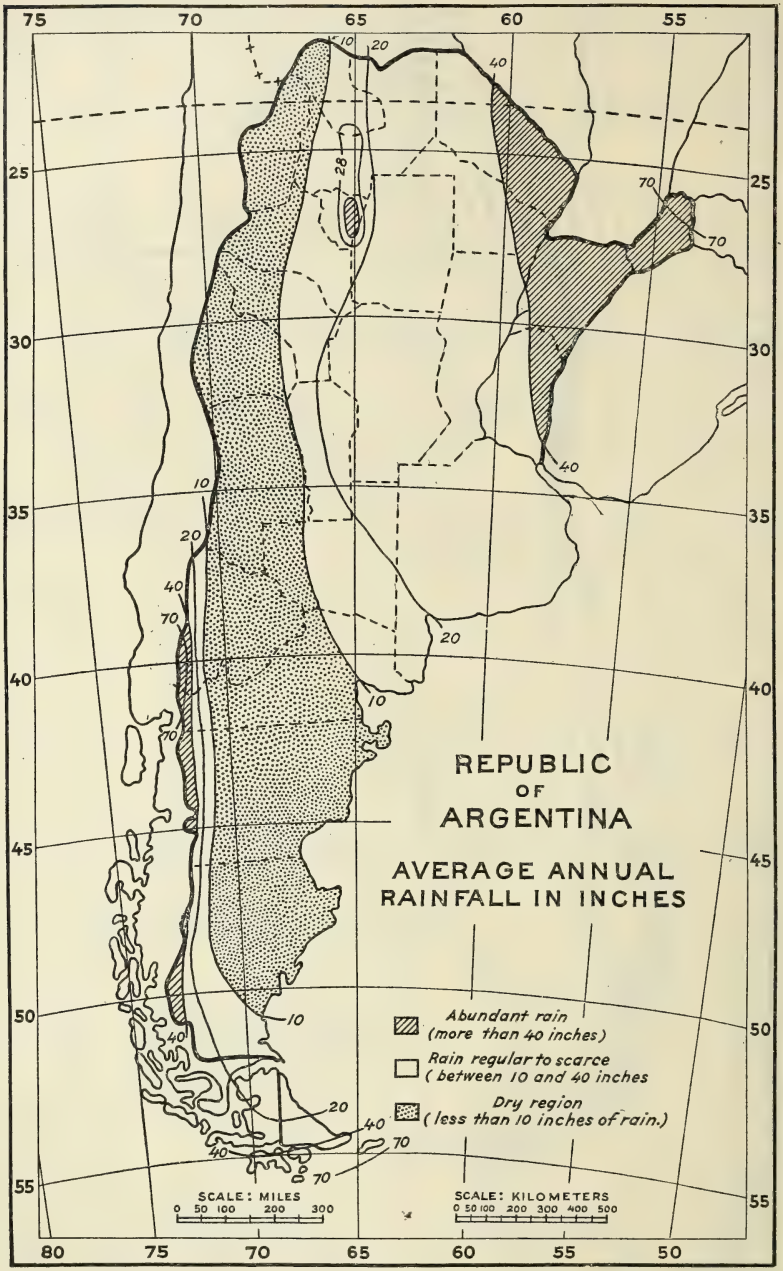

FIG. 4.—Average annual rainfall. In the extreme northeast, rainfall exceeds 40 inches and summer conditions are subtropical. Parallel with the Andes Range is a dry region with less than 10 inches of rainfall. The great agricultural region of Argentina lies in a broad belt between these two regions of extremes in rainfall

Approximately one-third of the Republic is too dry for crops without irrigation. In a large part of the Pampa region the rainfall varies widely from the average in some years; that is, it is either very much greater or very much less than the average, so that in the very dry years the crops burn up and in the very wet years they are damaged by excessive rainfall. For example, San Vincente, in the Province of Buenos Aires, with an average rainfall of 32 inches, had only about 13 inches in 1910 but more than 70 inches in 1914. Parana, in the Province of Entre Rios, with an average rainfall of 33 inches, had less than 5 inches in 1910 and more than 60 inches in 1914. In many of the drier regions practically no rain falls during the winter months of June, July, and August. In periods of prolonged droughts, livestock losses are likely to be exceptionally heavy.

HUMIDITY

As a general rule, the humidity is high along the coast and in the northeastern part of Argentina, but is very low in the interior and extreme west. The high humidity at Buenos Aires makes the heat oppressive and the cold penetrating.

SOILS

Throughout the great cereal region of Argentina there is a deep black loam prairie soil, becoming more and more sandy and lighter in the west. The whole of this area is almost free from stones, except north of La Plata River and east of the Parana where there are outcroppings of rock and clay. To the north of this region, through the Chaco country especially, the soil is similar in character, a dark sandy loam, becoming more sandy in the west. Outside of these two regions there are alternating areas of loam, clay silt, sand, gravel, and rock. Throughout most of Argentina the soil is alkaline, and especially in the semiarid areas where there are accumulations of salts on or in the surface layers. Within 200 miles of Buenos Aires to the west are many shifting sand dunes which make soil binders necessary. In Argentina the soils are classified as shown in Table 3.[3]

TABLE 3.—*Argentina soils*

	Clay	Sand	Silt	Humus
	Per cent	*Per cent*	*Per cent*	*Per cent*
1. Ideal soil	20 to 30	50 to 70	5 to 10	5 to 10
2. Clay soil	More than 40	Less than 50	Less than 5	5 to 10
3. Clay sand	More than 30	50 to 70	Less than 5	5 to 10
4. Clay loam	More than 30	Less than 50	5 to 10	5 to 10
5. Clay humus	More than 30	Less than 50	Less than 5	More than 10
6. Sandy	Less than 10	More than 80	Less than 5	5 to 10
7. Sandy clay	10 to 20	More than 70	Less than 5	5 to 10
8. Sandy loam	Less than 10	More than 70	5 to 10	5 to 10
9. Sandy humus	Less than 10	More than 70	Less than 5	More than 10
10. Loam soil	Less than 10	50 to 70	More than 10	5 to 10
11. Humiferous	Less than 10	Less than 50	Less than 5	More than 30

[3] Girola, C. D. Investigación agrícola en la República Argentina. Buenos Aires, Compañía Sud-Americana de billetes de banco, 1904. República Argentina. Anales del Ministerio de agricultura. Sección agricultura; botánica y agronomia. Agronomia. t. I, n 1.

From a special survey made by the Argentine Government in 1902–03, it appears that the larger portion of Argentine soils are sandy; sandy-clay soils are frequent; clay-sand soils are rare, and clay soils are very scarce. Other surface soils are less frequent. Clay soils and soils rich in lime are found in the subsoil over large areas. The alkali soils are most frequent in the west and central portion of the country. The most fertile soils are found in the central and northern regions, especially in the Provinces of Buenos Aires, Santa Fe, and parts of Cordoba and Entre Rios. Soil analyses made during the same period show the results presented in Table 4.

TABLE 4.—*Soil analyses by Provinces*

Province	Coarse sand	Fine sand	Clay	Humus	Nitrogen	Lime	Potassium	Phosphoric acid
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Buenos Aires	15 to 85	13 to 65	1 to 28	0 to 64	1 to 4	4 to 55	3 to 9	1 to 3
Santa Fe	7 to 67	22 to 75	3 to 47	2 to 78	1 to 9	3 to 14	2 to 9	1 to 5
Entre Rios	1 to 84	7 to 66	5 to 52	0 to 40	1 to 3	1 to 74	1 to 11	1 to 3
San Luis	41 to 87	9 to 42	1 to 18	1 to 14	1 to 3	7 to 40	4 to 9	1 to 2
Santiago del Estero	3 to 77	18 to 77	2 to 40	0 to 24	1 to 3	4 to 60	5 to 13	1 to 3
Mendoza	6 to 80	10 to 69	1 to 35	0 to 20	1 to 3	6 to 87	2 to 10	1 to 4
Misiones	5 to 42	14 to 57	9 to 66	0 to 28	1 to 10	1 to 14	1 to 11	1 to 8

Apparently the soils of Argentina, at least in the great central region, do not need lime because all forms of legumes grow well without inoculation. Various common and wild clovers and medicagoes volunteer and grow luxuriantly in the fields and pastures and by the roadsides. A feature peculiar to large areas in the south and western portions of the Province of Buenos Aires is an underlying hard pan of "tosca" which appears to be stratified nodules of clay, light in color and similar to limestone. Along the southern coast and north from Bahia Blanca this hard pan is very close to the surface, sometimes within a few inches, and in places it looks like solid limestone rock. In these areas alfalfa and other deep-rooted plants can not grow and all plants suffer severely unless rains are frequent. This hardpan extends for 100 miles north of Bahia Blanca, but the surface soil above it gradually becomes deeper and deeper.

VEGETATION

More than 90 per cent of all the cultivated crops of Argentina are grown in the Pampa and Mediterranean regions within a radius of 350 miles of the city of Buenos Aires. Among the uncultivated plants are to be found most of the weeds that are common in the United States, and practically every cultivated plant grown in the United States is to be found in Argentina. All the field crops are grown in some portion of Argentina, all the common garden vegetables and flowers, and many that are not common in the United States; but, certain of our small fruits and many trees are lacking. For example, there are no blackberries or dewberries. Raspberries. currants, and gooseberries are grown only as specimen plants. Strawberries are rare and generally very poor in quality.

TREES

The native trees of Argentina are generally very different from those of the United States. The eastern populated third of Argentina was originally a treeless prairie—the great Pampa. About the only native trees found in this region are the ombu and the ceibu. The ombu (*Pircunia dioica*) is a stately tree that grows most frequently in the eastern part of the Province of Buenos Aires. A few isolated specimens are to be seen a few hundred miles west of the coast, and from Bahia Blanca north and eastward to Uruguay. They always grow as isolated specimens and on the open prairie are prominent landmarks. The wood is soft and unfit for either lumber or fuel.

The second characteristic tree of the Pampa region is the ceibu (*Erythrina cristagalli*), which is a low-growing many-branched and very crooked tree that prefers the swamps and river banks. It is especially common in the delta region of the Parana. It rarely grows more than 20 feet high, the trunk and limbs are very crooked, the leaves are oval and glossy, the blossoms are a deep rich velvety scarlet, and the wood is of no apparent value and almost as light in weight as cork.

The Pampa region is no longer treeless as the cities and towns and the owners of estates have planted millions of trees for ornament, shade, fuel, posts, and other uses during the last 50 years, more especially during the last 20 years. The varieties most commonly planted, in the order named, are Lombardy poplars, willows, eucalyptus, cottonwoods, china berries, casuarinas, which closely resembles a tall pine, cedars of various kinds, and black locusts.

West of the Pampa region are great areas in which the calden, algarroba, and chanar predominate, followed by the semidesert regions in which low-growing thorny shrubs and cactus are the only living plants.

The calden (*Prosopis algorrobilla*) is the most common and the most valuable tree found in the western part of the Pampa. It is a tree of extremely slow growth and lives to a great age in the semiarid region. It attains a height of about 35 feet and a trunk diameter of 3 feet, with coarse, lichen-covered bark. The trunks are fairly straight, usually inclined in the direction of the prevailing winds, and the wood is very hard, a dark reddish brown in color, very brittle, and useful only for fuel. The calden forests have been exploited for fuel and millions of tons have been used for this purpose by the railway locomotives. Many train loads are exported to Buenos Aires and to intermediate cities and towns for fuel.

The algarrobo (*Prosopis campestris*) is a leguminous tree with feathery compound leaves, and at a distance it resembles an apple tree. It is to be found growing within and on the outskirts of the calden forests. The wood is very hard and durable, mottled dark brown and white in color, takes a fine polish, and is used for lumber, posts, tool handles, and fuel.

The chañar (*Gourliaea decorticans*) is more of a shrub than a tree. It grows throughout the same general region as the calden and algarrobo, but extends much farther into the semidesert region. It is about as ornamental as holly, is slow in growth, small in size, crooked in shape, and produces but little wood, although it is utilized, as fuel.

In the same semidesert region between the wooded zone in the western Pampa and the eastern slope of the Andes, perhaps the most common shrub is the jarilla (*Larrea cuneata*), which grows usually in a cluster with straight stems about the height of a man's head, with narrow, willow-like leaves which are alternate and usually point due north, south, east, or west. There are many other small, spiny, low-growing, dull-gray shrubs in the desert region. The cactus most common in this region is a small pear-shaped plant 8 to 10 inches long and about 3 inches in diameter, with needle-shaped spines 3 to 6 inches long. It often grows in mats, sometimes several acres in extent.

The mountain regions of Argentina are generally bare of vegetation except far to the south where on the slopes and in the valleys are to be found forests of pine, beech, araucaria, cedars, and oaks. The semidesert region of Patagonia is much like the region of the same character as the western Pampa. In the north there are some calden, algarrobo, chanar, jarilla, and other shrubs and cactus. Willows grow along the streams, and in the irrigated sections in Rio Negro and Neuquen are the usual plantings of Lombardy poplars and willows for windbreaks and fuel.

The Gran Chaco is generally a wooded region wherever there is sufficient moisture to support vegetation. Except for small colonies near railroad stations and river landings the country is unsettled. Among the most valuable trees of the Chaco region is quebracho colorado (*Schinopsis lorentzii*), which is used for posts, railroad ties, tannin extract and fuel—having the same value and selling for the same price per ton as coal. This is the most valuable tree of Argentina. It is a tree of relatively slow growth, survives to a great age, reaches a height of 45 to 50 feet, with a trunk diameter in exceptional cases of 3 feet. The trunk is fairly straight, but the branches are crooked and the leaves are small. The wood is exceptionally hard (from which it derives its name "break ax"). It can be worked only with the finest steel tools and split only between the annual rings, as the fibers are so crossed and interwoven that it is impossible to split it across the grain. It is heavier than water, is a deep rich mahogany red in color, and contains from 15 to 25 per cent tannin. A large part of this valuable forest product has already been cut and probably not more than 50 per cent of the original supply remains.

Quebracho blanco (*Aspidospermo quebracho blanco*) is another valuable tree that grows in the Chaco and is used principally for fuel. In this region are many algarrobo trees, acacias, and other thorny trees and shrubs, and in the drier regions to the west are immense areas covered with giant cacti.

Palo santo (*Bulnesia sarmienti*) is a tall-growing tree found in the Chaco country, but is not very plentiful. It has a wonderful heavy dark green, almost black, wood which is extremely hard, heavier than water, and contains an oily resin which exudes and preserves the wood. It is used in the keels of ships and as a packing for propellers because of its extreme hardness and durability. It is also used for fine cabinet work. It takes a fine polish and has a beautiful dark-green color.

Cedro (*Schinopsis hieronymi*) is a magnificient tree which grows in the north of Argentina. It resembles the ailanthus and the wood is like mahogany and works easily. It is possible to obtain planks

3 inches thick, 3 feet wide, and 30 feet long with a clear grain and very few knots. It is used for furniture and for house trimmings.

The jacaranda (*Jacaranda chelonia*) is a tall, graceful tree with racemes of blue blossoms and violet-colored wood that is excellent for fine cabinet work. The lepacho is a big tree with large pink blossoms and straight-grained, tough, durable wood much used for wagons, farm implements, construction, and fencing. The tipa (*Machaerin tipa*) is a tree much used for street planting. Its profuse blossoms retain their color for several days. A small-growing hackberry (*Celtis sellowi*) is rather common. The pepper tree (*Schinus dependeus*) reaches great size in the north and there is an avenue of fine specimens in Cordoba. The chinaberry tree (*Melia azederach*) is planted extensively throughout the northern half of Argentina for fuel and shade. In Santa Fe chinaberries have been planted between estates and they stretch across the flat prairie in straight lines from horizon to horizon. The cina cina (*Parkinson acutifolia*) is a curious shrub with long, needle-like leaves and bright yellow blossoms and is much used for hedges.

The pacara (*Enterolobium timbowa*) grows to large size in the north country. It has a jet black, circular, convoluted seed pod the shape and size of a human ear, and is commonly called "oreja negro" (negro ear). Perhaps the most curious of all the trees of northern Argentina is the palo borracho (*Chorisia speciosa*) or "drunken tree." It has a remarkable bottle-shaped, short, thick trunk. Starting at the ground with a diameter of 2 feet, it swells out like a barrel to a diameter of 3 feet or more a short distance above ground and then tapers to a diameter of 1 foot at a height of 12 to 16 feet, where the branches begin. The bark is light gray or green and smooth, except for innumerable conical warts the size of walnuts which are often spiny. The foliage is very thin. The blossoms are pink, with petals 3 inches long. The seed pods are similar to cotton bolls and as large as an orange. The smooth black seeds are hard, about the size of cottonseed, and are surrounded with a mass of long, silky, white fiber, used formerly by the Indians for spinning and weaving. It is really a tree cotton, and when the pods open and the silky fiber fluffs out they look like giant cotton bolls. The swollen trunks are sometimes used for making dugout canoes.

A conspicuous feature of the landscape in northern Entre Rios, Corrientes, Chaco, and Formosa are the "palmeros," or open groves of palms (*Cocos yatay*) with grass growing between and underneath them. They are tall, straight, and cover immense areas. The wood is hard and durable and the trunks are used for fuel, telegraph and telephone poles, posts, and cheap construction work.

Giant cactus (*Opuntia* sp.) cover great areas in Santiago del Estero and other dry sections. They reach a height of 24 feet and a stem diameter of 16 inches, and bear fruits the size of a small pear.

Throughout the subtropical region the trees support flowering air plants and are draped and interlaced with vines and mosses. In the wooded country the larger trees are scattering, only a few large specimens to an acre, usually with a thick, impenetrable undergrowth of acacias, spiny shrubs, and cactus.

In sections of little rainfall the tamarisk is much used for hedges and windbreaks.[4]

PLANTS

Aside from trees, shrubs, air plants, vines, and cactus, plant life is poor in the mountainous, semiarid, and wooded regions. Throughout the Pampa and Mediterranean regions grass, forage plants, cereal crops, and weeds are most general and important. The native coarse bunch grasses (pasto duro) are most common, with some finer grasses (pasto tierno) mixed in between. Various species of clover, medicago, and legumes grow spontaneously. Alfalfa thrives without liming or inoculation. Cebadilla, bluegrass, rye grass, various stipas, vetches, sweet clovers, alfilerillo, and many other grasses and weeds eaten by livestock are common.

The most conspicuous plants in summer are the various species of giant thistles, cardo de Castilla (*Cynara cardunculus* Tr.), cardo negro (*Cirsium lanceolatum* C.), and cardo Asnal (donkey thistle). These thistles grow higher than a man's head, as thick as they can stand, and cover hundreds of square miles. When in bloom they form a sea of pink and reddish purple as far as the eye can see. When the seeds ripen the silken parachutes fill the air like transparent snowflakes. Although cattle and horses break paths through these forests of thistles and browse on the leaves, they are regarded as a troublesome pest and on some of the ranches efforts are made to cut them with mowing machines just before blossoming. The infested areas are so great that it will be impossible to control these thistles until the estates are subdivided into smaller units, more of the land is brought under cultivation, and population increases.

Foxtail (cola de zorro) covers large areas and the Russian thistle, cocklebur, and Bermuda grass are pests. Wild mustard, turnip, and a small yellow-flowered chicory are especially bad in the grain and alfalfa fields.

Among the characteristic bunch grasses of Argentina, the highly ornamental Pampas grass (*Gynerium argenteum*) is widely distributed. It prefers moist ground and grows from 3 to 10 feet high, usually in isolated bunches or colonies. It seems to flourish best in the Chaco. Its stately silver plumes can be seen waving in the glades of the wooded country and across the open prairies. Many of the plumes are 3 feet long, 8 inches in diameter, borne on bamboolike stems.

The marshes and margins of lagoons and streams are grown up with rushes, reeds, and cattails, and stagnant water, especially in the north, is usually covered with water lilies, hyacinths, and other aquatic plants. Wild cannas grow in damp places, and wild verbena with scarlet, purple, or white flowers, bright-red Portulaca, a pink-flowered oxalis, evening primose, and goldenrod are widely distributed. Castor beans are grown in fields and about the houses in the north country and often grow wild along ditches and roadsides. Some of these plants attain the size of a small tree with woody stems 6 inches or more in diameter. An ornamental plant frequently seen about houses and on walls and fences is a native clematis which

[4] For a more complete list of the trees and shrubs of Argentina see pp. 198 216 of C. D. Girola's Investigación agrícola en la República Argentina. Buenos Aires, Compañía Sud-Americana de billetes de banco, 1904. (República Argentina. Anales del Ministerio de agricultura. Sección agricultura; botánica y agronomia. Agronomia, t, I, n. 1).

has scattering blooms every month of the year. In cities and towns ivy, honeysuckle, and morning-glories are commonly grown on walls, fences and low buildings.[5]

ANIMAL LIFE[6]

When the Spanish explorers first came to Argentina they found it sparsely inhabited by tribes of Indians, the Guaranís in the north, the Quichuas in the north and center, the Araucanians in the south and west, and the Minuans in the country east of the Parana River. There were many smaller tribes forming part of or related to these four principal groups. These Indians lived by hunting and fishing. They had few or no domestic animals and little agriculture, except in the northwestern mountainous region, where small patches of corn, beans, and other vegetables were grown by the women. Their rude implements were of wood or stone and their weapons were bows and arrows, throw sticks, spears, and bolas. The number of Indians in the country has never been known, but has been estimated at from 75,000 to 300,000.

The Spanish colonizers brought domestic animals with them and under the exceptionally favorable conditions of climate, soil, and pasturage these multiplied rapidly, especially the cattle and horses, which nearly two centuries ago roamed the Pampas in countless numbers like the buffalo on the Plains of North America.

Among the forms of animal life found in Argentina are three varieties of monkeys, the jaguar (*Felis onca*), several varieties of wildcats, the puma or panther (*F. concolor*), wolves, wild dogs, foxes, skunks, nutrias (*Lutra paranensis*), many representatives of the opossum family, some of which carry their young in pouches, the guanaco, an animal related to the camel and llama (guanaco, alpaca, and vicuna), several species of deer, several wild pigs, two anteaters, a number of bats, and a great variety of rodents, including rats, mice, rabbits, the chinchilla (*Eriomys chinchilla*), valuable for its fur, the viscacha (*Lagostomus trichodactylus*), destructive to meadows and crops, the carpincho (*Hydrochoerus capybara*), as large as a hog and similar in appearance, and various armadillos that are covered with jointed horny plates and are prized for eating.

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[5] For a more complete list of the grasses and forage plants of Argentina see the following:
Buenos Aires (City) Museo nacional de historia natural. Anales . . . tomo XXIX. Buenos Aires, Imprenta de Coni Hermanos, 1917.
Buenos Aires (City) Universidad nacional. Facultad de agronomía y veterinaria. Las plantas forrajeras indígenas y cultivadas de la Repbúlica Argentina. Buenos Aires, Talleres S. A. Casa Jacobo Peuser, ltda., 1923.
Girola, C. D. Investigación agrícola en la República Argentina. Buenos Aires, Compañía Sud-Americana de billetes de banco, 1904, pp. 70–79. República Argentina. Anales del Ministerio de agricultura. Sección agricultura; botánica y agronomia. Agronomia. t.I, n 1.
Holmberg, E. L. La flora de la República Argentina *in* Argentine Republic. Comisión directiva del censo. Segundo censo de la República Argentina, mayo 10 de 1895. Buenos Aires, Taller tip. de la Penitenciaria nacional, 1898, t. I, quinta parte, pp. 385–474.
Spegazzini, Carlos. Apuntas para un corto resúmen de la flora agropecuaria de la República Argentina, *in* Argentine Republic. Comisión del censo agropecuario. Censo agropecuario nacional. La ganadería y la agricultura en 1908. Monografías . . . t. III. Buenos Aires, Talleres de publícaciones de la Oficina meteorológica Argentina, 1909, pp. 467–497.

[6] Argentine Republic. Comisión directiva del censo. Segundo censo de la República Argentina, mayo 10 de 1895 . . . tomo I, Territorio. Buenos Aires, Taller tip. de la Penitenciaria nacional, 1898.
Azara, Felix de. Viajes por la América meridional. Madrid, Calpe, 1923. t. 1–2. Viajes clasicos.
Levene, Ricardo. Lecciones de historia Argentina. . . 7. ed., corr. Buenos Aires, J. Lajouane & cia, 1923, t. I.
Napp, Ricardo. La República Argentina obra escrita en aleman . . . con la ayuda de varios colaboradores y por encargo del Comité central argentino para la Exposicion en Filadelfia. Buenos Aires, Impreso por la sociedad anónima, 1876.

Native birds are abundant and are found in greatest variety in the north. There are many birds of prey, including the great condor of the Andes, eagles, buzzards, hawks, falcons, and owls. Parrots and parrakeets are abundant in the northern woods but range into Patagonia. There are many species of woodpeckers.

Two birds, the cachalote and the hornero, attract much attention because of their curious nests. The cachalote builds a large nest of sticks and twigs 2 or 3 feet long and more than a foot in diameter, which is hung from the ends of branches. The hornero (oven bird) builds a neat, oval mud house, shaped like a native oven and as large as a man's hat, which it places on top of a telegraph pole or post or on the limb of a tree.

There are many species of humming birds, especially in the north. Various swallows and martins are common. One of the most attractive birds seen in the Pampa region is the red breast (pecho colorado), which is coal black in color with a vermilion-red breast. It is related to the North American meadowlark and is similar in action but is smaller.

There are several species of doves, some of which are alike in appearance but differ greatly in size. The smallest is but little larger than a sparrow.

The family of tinamous, birds that resemble partridges but are related to the ostrichlike birds, includes several species known in Spanish as perdiz chica, perdiz de la sierra, and the martineta. The martineta is a fine game bird about the size and appearance of a grouse or prairie chicken. They are very abundant throughout the Pampa region and in recent years large quantities have been exported under refrigeration to New York.

Waterfowl abound on the lakes and rivers and include many species, such as storks, herons, flamingoes, black-necked swans, white swans, and several varieties of geese, ducks, and gulls.

Perhaps the most curious bird of Argentina is the ostrichlike bird known as the rhea, avestruz, or ñandu. It is omniverous but lives principally upon grass and insects. The total number of rheas was estimated in 1914 at 378,000. Most of these are in the inclosed pastures of the larger ranches and form a conspicuous feature of the landscape. They go in small flocks and at a distance, when feeding, they resemble sheep. Their feathers are neither so long nor so valuable as those of the African ostrich and are used principally for feather dusters. The exports of rhea feathers have ranged from 25 to 80 tons per annum.

Turtles and terrapins are common. The jacaré (*Alligator schlerops*) can be seen by the hundred in the semitropical region of the north, especially along the river banks and in the great Iberá Lagoon. The iguana (*Podinema teguixin*) is a large lizard found over a considerable extension of the north country that is said to eat both chickens and eggs and there are many small lizards.

Snakes are not very abundant. The most poisonous are the vibora de la cruz and the vibora del cascabel (rattlesnake). A few of the large anacondas are found in the Chaco country. Snakes are rare in the Pampa country, probably because of the practice of annually burning off the grass, lack of water, and the presence of natural enemies.

Frogs and toads are very common, especially in the swamps, along the rivers, and in cultivated gardens. The species found in general resemble those of the United States, except the escuerzo, which is a large green toadlike creature with white and yellow stripes, about twice the size of an ordinary garden toad. It has the power to swell up like a little balloon until it is as large as an orange or a base ball. It barks like a ground squirrel, is very combative and pugnacious, and will attack any living thing that approaches. It bites and hangs on like a snapping turtle. The natives fear it in belief that its bite is fatal.

Along the coast and in the rivers and some of the larger lagoons are many species of fish. Among the most abundant on the coast are the gallo, lacha, arenque (herring), sardina (sardine), bagre, and congrio. One of the most highly prized fish for the table is the pejerrey, of which there are several varieties, including one that is found in the rivers and lagoons. It is a slender fish with very delicate flesh. The dorado is a large river fish that resembles somewhat the salmon. Some shell fish of diminutive size are found along the coast, and shrimp of various kinds are abundant. Whales, seals and dolphins are found along the coast of Patagonia and Tierra del Fuego.

As in all countries with a mild winter climate, many species of insects flourish in Argentina. In addition to the domestic honeybee, which supports a profitable industry in many sections, there are several species of wild bees. Bumblebees and hornets, mud daubers, and other wasps are well represented, and two species of wasps, locally known as the lechiguana and the camuati, produce a kind of honey. Black, brown, and red ants are very abundant and cause much damage. One species found in Cordoba is carnivorous and drives out other ants. The black ants are widely distributed and quickly defoliate the plants, trees, and vines in gardens and parks. In northern Argentina a termite or white ant builds nests on the ground in the form of a cone 18 inches to 4 feet in height, made of earth cemented with a secretion so that it is as hard as brick. These ant hills are conspicuous in the landscape and often cover several square miles like the stumps of cut-over timberland, especially where the ground is flat and damp.

There are, of course, many kinds of bugs, plant-lice, scale insects, weevils, beetles, butterflies and moths, dragon flies, praying mantids, grasshoppers or locusts, crickets, animal lice, fleas, flies, mosquitoes, spiders, ticks, chiggers, scorpions, centipedes, nematode worms, etc., that live upon plant life or prey upon other forms of animal life.

Perhaps the most serious insect pest in Argentina is a grasshopper or locust, the Langosta (*Schistocerca paranensis* Burm.). These locusts resemble the large flying grasshoppers of the United States and are very destructive to all tender vegetation. Some years they come in swarms that darken the sky and when they settle they eat practically all green vegetation, destroying the crops of entire Provinces. They are present every year, but are worse in dry years and in the northern third of the country. The swarms seldom reach as far south as the city of Buenos Aires. An expensive systematic campaign has been waged against locusts for many years without much apparent effect. In the campaign of 1924 more than 165,000 tons of these voracious insects were reported to have been destroyed under Government supervision.

A very common and widely distributed insect is a basket worm, bicho de cesto (*Oeketicus platensis* Berg). This insect covers itself with a gray silk cocoon, suspended from a twig. These cocoons may be seen hanging as thick as leaves on hedges, bushes, fruit, and other trees. The caterpillars strip the trees and bushes of their leaves within a few hours or days.

The tarantula is also found. This is a large velvety black or brick-red spider with long, vicious-looking fangs. It is sometimes nearly as large as a man's hand, can run and leap, and is said to be very poisonous.

Flies of many kinds are numerous and annoying. These include the common house fly and several species that torment livestock. Horses, milk cows, and goats are kept in the cities and towns, and in the country large numbers of livestock are kept near the dwellings, and the flies breed in the manure. Little effort is made to hold the pest in check or to screen dwellings and food against them. Mosquitoes breed in the numerous lagoons and marshes and make protection a necessity, especially at night. South of Rosario the mosquitoes are said not to carry malaria, but in many sections to the north malaria is a serious malady. In the northern third of Argentina a considerable portion of the population is affected with malaria and the hookworm disease.

The cattle tick or garrapata is another serious pest, especially in the semitropical region of the north, where it is difficult for imported purebred animals to survive infection.

One of the largest branches of the Argentine Department of Agriculture, the Division de Defensa Agricola, is organized to carry on systematic campaigns against the numerous insect pests and diseases with which the farmers and livestock men have to contend. National and Provincial laws require producers to participate actively in these campaigns and to follow the instructions of Federal officials and to cooperate with them in their efforts to exterminate these pests.

POPULATION [7]

In 1535 Pedro de Mendoza arrived at the mouth of La Plata River with a large party and founded Santisima Trinidad in the port of Santa Maria de Buenos Aires, but this post had to be abandoned because of the hostility of the Guarani Indians and lack of food. However, a part of Mendoza's force ascended the Parana River and founded La Ascuncion, capital of Paraguay, in 1537. In 1573 Juan de Garay brought another expedition from Spain and founded the city of Santa Fe. In 1580 Garay refounded Buenos Aires.

It is not known what the Indian population of Argentina was at the time of its discovery. The Spanish conquistadores were few in number, did not bring families with them, and mixed freely with the

[7] Data relating to the population of Argentina was in part furnished by the Dirección de Economía Rural y Estadística de Ministerio de Agricultura de República Argentina and in part was compiled from the following publications:

Argentine Republic. Tercer censo nacional levantado el 1. de junio de 1914. Ordenado por la ley no. 9108. Comisión nacional . . . tomo IV, Población. Buenos Aires, Talleres gráficos de la L. J. Rosso y cia, 1916.

Martinez, A. B., and Lewandowski, Maurice. The Argentine in the twentieth century . . . Translated by Bernard Miall from the French of the 3. ed., rev., and brought up to date. London, Leipsic, T. Fisher Unwin, 1911.

Napp, Ricardo. La República Argentina obra escrita en aleman . . . con la ayuda de varios colaboradores y por encargo del Comité central argentino para la Exposición on Filadelfia. Buenos Aires, Impreso por la sociedad anónima, 1876.

Indians. In 1702 negroes were first brought into the country as slaves. Their importation was prohibited in 1825 and they were declared free in 1853. The first authoritative estimate of population was given by Azara for 1797, 217 years after the third founding of Buenos Aires. His estimate of the total population in that year was 310,628. The next estimate is 22 years later by La Fuento, who gave the total population as 527,000 Argentines and 175,000 Indians.

The last census of 1914 showed a total population of 8,092,216, of which 5,527,285, or 68.3 per cent were Argentines, 2,357,952 or 29.1 per cent were foreigners, and 206,979 was estimated as the number of Indians. Of this total 57.4 per cent lived in cities and towns and only 42.6 per cent in the country. About one-fifth of the total population lived in the capital city of Buenos Aires. By nationalities, the population in 1914 is shown in Table 5.

TABLE 5.—*Aregntina: Nationality of population, 1895 and 1914*

Nationality	1895 census	1914 census	Nationality	1895 census	1914 census
	Per cent	*Per cent*	Foreign—Continued.	*Per cent*	*Per cent*
Argentine	74.6	68.3	Chilean		.4
Indian		2.6	Paraguayan		.3
Foreign:			English		.3
Italian	12.5	11.5	German		.3
Spanish	5.0	10.2	Bolivian		.2
Russian		1.2	Swiss		.2
Uruguayan	1.2	1.1	Portuguese		.2
French	2.4	1.0	Other	4.3	.5
Ottoman		.8			
Austro-Hungarian		.5	Total foreign	25.4	29.1
Brazilian		.4	Total native and foreign	100.0	100.0

The number of immigrants in the early years of the Republic is not known, but from 1857 to 1914 there arrived 4,665,723 and departed 1,625,721, leaving the net immigration in the period of 57 years at 3,040,002, or an average of little more than 50,000 per annum. In 1923 about 195,000 immigrants were received. It seems likely that this number will be greatly exceeded in the near future because of the restrictions on immigration to the United States and the fact that Argentina is now one of the most promising countries in the world for European emigrants. The need for population in Argentina is so apparent that in 1924 the Minister of Argentina spent some months in Europe with a view to encouraging emigration to Argentina. The census figures, so far as available, are presented in Tables 6 to 11.

TABLE 6.—*Population of Argentina*

Year	Estimated population	Increase in population		
		Total	Percentage	
			Total	Annual
	Number	*Number*	*Per cent*	*Per cent*
1797	310, 628			
1819	527, 000	216, 372	69. 7	3. 2
1837	675, 000	148, 000	28. 1	1. 6
1860	1, 210, 000	535, 000	79. 3	3. 5
1869	1, 830, 214	620, 214	51. 3	5. 7
1895	4, 044, 911	2, 214, 697	121. 0	4. 6
1914	8, 092, 216	4, 047, 305	100. 1	5. 2

Argentina Republic. Comisión directiva del censo. Segundo censo de la República Argentina, mayo 10 de 1895. Buenos Aires, 1898, Vol. II, p. XVIII.
Argentina Republic. Comisión nacional. Tercer censo nacional levantado el 1. de junio de 1914. Buenos Aires, 1916, Vol. I, p. 85.

TABLE 7.—*Analysis of the population in 1817 and 1914*

Year	Total	Argentines	Foreign	Indian
1817	702, 000	527, 000	(1)	175, 000
1914	8, 092, 216	5, 527, 285	2, 357, 952	206, 979

[1] No data available.

TABLE 8.—*Population: Urban and rural, by nationalities, 1914* [1]

Nationality	Urban	Rural	Total	Percentage of total population	
				Urban	Rural
	Number	*Number*	*Number*	*Per cent*	*Per cent*
Argentine	2, 915, 093	2, 612, 192	5, 527, 285	52. 7	47. 3
Foreign:					
Italian	637, 205	292, 658	929, 863	69	31
Spanish	613, 032	216, 669	829, 701	74	26
Russian	53, 638	39, 996	93, 634	57	43
Uruguayan	61, 726	24, 702	86, 428	71	29
French	54, 580	24, 911	79, 491	69	31
Turkish	46, 724	17, 645	64, 369	73	27
Austro-Hungarian	18, 853	19, 270	38, 123	49	51
Brazilian	19, 370	17, 072	36, 442	53	47
Chilean	8, 732	25, 485	34, 217	26	74
Paraguayan	13, 258	14, 791	28, 049	47	53
English	17, 105	10, 587	27, 692	62	38
German	17, 291	9, 074	26, 365	66	34
Bolivian	6, 738	11, 255	17, 993	37	63
Swiss	8, 585	5, 760	14, 345	60	40
Portuguese	8, 456	5, 687	14, 143	60	40
Other	25, 114	11, 983	37, 097	68	32
Total foreign	1, 610, 407	747, 545	2, 357, 952	68. 3	31. 7
Total native and foreign	4, 525, 500	3, 359, 737	7, 885, 237	57. 4	42. 6

[1] Census of 1914 does not include Indians.

TABLE 9.—*Classification of foreign population, census of 1914*

	Number	Per cent
Rural	747, 545	31. 7
Federal capital	777, 845	33. 0
Other cities	832, 562	35. 3
Total	2, 357, 952	100. 0

TABLE 10.—*Classification of immigration, 1857–1914 and 1923*

Nationality	1857–1914	1923	Nationality	1857–1914	1923
	Number	*Number*		*Number*	*Number*
Italian	2, 283, 882	91, 992	Rumanian	4, 016	1, 487
Spanish	1, 472, 579	48, 430	Brazilian	----------	1, 256
French	214, 198	1, 545	Polish	----------	9, 938
Russian	160, 672	2, 990	Czechoslovakian	----------	5, 290
Ottoman	136, 079	----------	Syrian	----------	4, 650
Austro-Hungarian	87, 108	2, 039	Jugoslavian	----------	2, 598
German	62, 006	10, 138	Turkish	----------	1, 613
English	55, 055	----------	Ukranian	----------	1, 317
Swiss	33, 057	----------	Others	72, 686	6, 906
Portuguese	26, 394	2, 873			
Belgian	22, 960	----------	Total	4, 665, 723	195, 062
Grecian	12, 223	----------			
Danish	8, 813	----------	Emigrants	1, 625, 721	----------
Dutch	7, 548	----------	Net immigration	3, 040, 002	----------
North American	6, 447	----------			

TABLE 11.—*Immigration, 1904–1913, 1919–1923*

Year	Number	Year	Number	Year	Number	Year	Number
1904	125, 567	1908	255, 710	1912	323, 403	1921	108, 591
1905	177, 117	1909	231, 084	1913	302, 047	1922	139, 953
1906	252, 536	1910	289, 640	1919	41, 299	1923	195, 062
1907	209, 103	1911	225, 772	1920	99, 809		

POPULATION OF CITIES AND TOWNS

In the last census (1914), 333 cities and towns are listed as having a population of 2,000 or more. These may be grouped as follows:

More than 500,000:	
Buenos Aires	1, 575, 814
More than 200,000:	
Rosario	222, 592
More than 100,000:	
Cordoba	104, 894
50,000 to 100,000:	
Tucuman	91, 216
La Plata	90, 436
Santa Fe	59, 574
Mendoza	58, 790
25,000 to 50,000:	
Avellaneda	46, 277
Bahia Blanca	44, 143
Parana	36, 089
Lanus	33, 013
Corrientes	28, 681
Salta	28, 436
Mar del Plata	27, 611
20,000 to 25,000:	
Santiago del Estero	23, 479
Chivilcoy	23, 241
Lomas de Zamora	22, 231
20,000 to 25,000:	
Mercedes (B. A.)	22, 078
Junin	21, 172
Pergamino	20, 549
Concordia	20, 107
15,000 to 20,000:	
Azul	19, 602
Quilmes	19, 311
San Nocolas	19, 085
Rio Cuarto	18, 421
Mercedes (S. Luis)	18, 256
Gualequaychu	17, 880
Tres Arroyos	16, 923
San Juan	16, 631
Tandil	15, 784
San Luis	15, 057
10,000 to 15,000: 18 cities.	
5,000 to 10,000: 84 cities.	
4,000 to 5,000: 28 cities.	
2,000 to 3,000: 172 cities.	
Total these 333 cities	4, 157, 370

INDUSTRIES

LIVESTOCK

The climate, topography, and vegetation of a large portion of Argentina are favorable to the production of livestock. This is especially true of the central and eastern portion, which corresponds

roughly with the humid and subhumid portion of the pampa region. The pasturage is good, water is abundant or easily provided, and no shelter and little or no feed are required in winter.

The first domestic animals were brought over by Pedro Mendoza.[8] In 1533, Charles V of Spain granted to Mendoza the right to "conquer and populate" the lands of La Platta River in a document which stipulated, among other things, that he should introduce breeding animals of horses and cattle. In compliance with these stipulations, Mendoza is said to have landed in 1536 with 16 cows, 2 bulls, 32 horses of both sexes, 20 goats, 46 sheep, and 18 dogs. These animals multiplied rapidly. In 1580, when Juan de Garay came down the river from Ascuncion to the abandoned city of Buenos Aires, he sent by land under guard of a company of soldiers 1,000 horses, 200 cattle, and 500 sheep. In 1581, a number of soldiers explored the country south of Buenos Aires as far as the Sierras of Tandil and reported that within 90 miles of Buenos Aires they saw great herds of horses "not less than 100,000" in number, which must have descended from those brought over by Mendoza.

Lopez says that in the sixteenth century "the country of Buenos Aires contained millions of horses, so that it was a profitable business to hunt the animals and export horse hair as contraband in small boats as far as Santos, Brazil;" and that "the population has an abundance of meat, of bread, and of certain vegetables; . . . Many of them are clothed in skins like the Indians and the women may be seen spinning the wool of sheep which, fortunately, begins to be abundant." Again he says: "Our exportation is composed in great part of horse hair, hides, cotton cloth (Indian), woolen blankets, fur hats, goatskins, and some silver that begins to come down from Peru." Cattle increased enormously on the open unfenced Pampa during the two centuries following the introduction of the first animals by Mendoza. They were practically wild and were hunted and slaughtered for their skins like wild animals.

Gradually, as the estates spread out from Buenos Aires and other centers of population, grants of large tracts of land were obtained, often without price, the wild cattle appropriated, branded, and herded or followed by the half-breed Gaucho or Criollo peons who were the cowboys of Argentina. About the time the small group of business men and young enthusiasts of Buenos Aires overturned the local Spanish Government in 1810, possibly half the Province of Buenos Aires was dotted with cattle ranches, the trade in hides had assumed considerable proportions, and arrangements were established for drying meats. At that period and until the coming of the wire fence, it was the custom to have an annual round-up for counting and branding the herds. It is related that before the half-wild cattle of the pampas had been rounded up and branded, it was the custom for bands of men to kill them by thousands for their skins.

It is related that a poor immigrant, seeing the waste involved in this method, conceived the idea of buying the cattle for the price of the skins, and driving them by easy marches across the open prairie to the establishments near Buenos Aires, where he was able to market both the hides and the carcasses. This operation proved very

[8] López, V. F. Manuel de la Historia Argentina, Buenos Aires, Administración general Vaccaro, 1920, p. 75 et seq. (La cultura Argentina).

successful and one of the great fortunes of Argentina was founded in this way.

TABLE 12.—*Estimated value* [1] *of livestock and average value per head, 1888, 1895, 1908 and 1914*

Kind of livestock	Total value				Average value per head			
	1888	1895	1908	1914	1888	1895	1908	1914
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dols.*	*Dols.*	*Dols.*	*Dols.*
Cattle	131, 163, 330	214, 998, 410	398, 483, 401	926, 455, 396	5. 79	9. 65	13. 51	35. 70
Horses	20, 987, 324	24, 598, 934	87, 375, 961	193, 109, 509	4. 82	5. 79	11. 58	23. 16
Asses		636, 356	1, 211, 961	3, 590, 026	4. 82	2. 89	3. 86	13. 51
Sheep	66, 764, 006	118, 309, 088	121, 987, 376	187, 123, 898	. 96	1. 93	1. 93	3. 86
Mules	2, 072, 233	3, 213, 554	7, 647, 847	11, 450, 213		11. 58	20. 26	20. 26
Swine	1, 679, 353	1, 955, 032	6, 653, 222	27, 211, 472	3. 86	2. 89	4. 82	9. 65
Goats	1, 092, 459	1, 877, 206	3, 532, 720	10, 761, 242	. 96	. 96	. 96	2. 89
Total	223, 758, 705	365, 588, 580	626, 892, 488	1, 359, 701, 756				

[1] Converted from gold pesos; 1 peso=$0.9648.

TABLE 13.—*Estimated value* [1] *of the livestock industry*

Item	1908	1914
	Dollars	*Dollars*
Land	2, 757, 222, 018	5, 188, 797, 017
Livestock	627, 986, 919	1, 359, 701, 757
Improvements	267, 623, 565	455, 826, 927
Total	3, 652, 832, 502	7, 004, 325, 701

[1] Converted from paper pesos; 0.44 of gold peso at par value of $0.9648.

It has been estimated by the Argentine Government that in 1873–1875, the number of livestock was:

Cattle	13, 993, 000	Sheep	57, 516, 000
Horses	3, 960, 000	Goats	2, 863, 000
Mules	132, 000	Swine	257, 000
Asses	267, 000		

Five national censuses of livestock have been taken in Argentina since 1873, as shown in Table 14.

TABLE 14.—*Five national censuses of livestock in Argentina*

	October, 1888	May 10, 1895	May, 1908	June, 1914	December, 1922	Per cent of 1922
Cattle:	*Number*	*Number*	*Number*	*Number*	*Number*	
Native	17, 574, 572	14, 197, 159	13, 958, 711	10, 311, 299	6, 492, 019	17
Mixed	3, 388, 807	4, 678, 348	14, 215, 168	15, 275, 689	29, 549, 234	80
Purebred	37, 858	72, 216	942, 746	379, 775	1, 023, 597	3
Milk cows and oxen	960, 426	1, 800, 799 953, 004				
Total	21, 961, 663	21, 701, 526	29, 116, 625	25, 866, 763	37, 064, 850	100
Horses:						
Native	3, 970, 066	4, 016, 297	5, 933, 344	5, 331, 731		
Mixed	259, 009	414, 985	1, 554, 118	2, 929, 720		
Purebred	4, 957	15, 577	43, 914	62, 364		
Total	4, 234, 032	4, 446, 859	7, 531, 376	8, 323, 815	[1] 9, 432, 421	

[1] Not included in census of 1922, but estimated on basis of 1914 census.

TABLE 14.—*Five national censuses of livestock in Argentina*—Continued

	October, 1888	May 10, 1895	May, 1908	June, 1914	December, 1922	Per cent of 1922
Asses and mules:	*Number*	*Number*	*Number*	*Number*	*Number*	
Asses		197,872	285,088	260,157	289,365	
Mules	417,494	285,497	465,037	565,069	623,416	
Total	417,494	483,369	750,125	825,226	[1] 912,781	
Sheep:						
Native	24,322,212	17,938,061	22,596,807	17,829,497	5,181,676	17
Mixed	42,002,871	56,106,187	43,652,460	24,875,588	23,842,829	78
Purebred	381,012	335,314	962,487	520,367	1,647,336	5
Total	66,706,095	74,379,562	67,211,754	43,225,452	30,671,841	100
Swine:						
Native	301,486	483,348	805,552	1,372,845	377,076	26
Mixed	88,678	155,719	566,185	1,467,086	947,002	66
Purebred	3,594	13,699	31,854	60,654	112,560	8
Total	393,758	652,766	1,403,591	2,900,585	1,436,638	100
Goats:						
Native	1,877,669	2,659,799		4,108,723		
Mixed	15,100	84,249		198,582		
Purebred	1,617	4,812		17,975		
Total	1,894,386	2,748,860	3,945,086	4,325,280	[1] 4,819,835	
Ostriches:						
Native	176,125	82,497	409,961	357,399		
African			12,822	20,499		
Total	176,125	82,497	422,783	377,898		
Poultry:						
Chickens	4,249,754	7,886,354	15,213,771	24,691,280		
Ducks, geese, and turkeys	1,060,123	1,224,968	1,507,409	2,114,793		
Total	5,309,877	9,111,322	16,721,180	26,806,073		

[1] Not included in census of 1922, but estimated on basis of 1914 census.

TABLE 15.—*Livestock by Provinces, census of 1914*

Provinces and Territories [1]	Cattle	Horses	Mules	Asses	Sheep	Goats	Swine	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Federal Capital	12,663	128,991	15,500	180	9,697	2,900	3,926	173,857
Buenos Aires	9,090,536	2,784,576	15,044	6,281	18,776,260	21,326	1,394,042	32,088,065
Santa Fe	3,179,260	1,097,277	26,497	3,415	563,896	35,281	474,326	5,379,952
Entre Rio	2,334,372	657,723	11,087	3,080	4,304,305	15,758	112,007	7,438,332
Corrientes	3,543,395	547,440	17,657	4,572	2,348,584	19,320	72,577	6,553,545
Cordoba	2,540,313	1,228,229	138,145	20,188	1,410,486	736,342	333,793	6,407,496
San Luis	603,254	231,854	52,748	13,434	592,110	473,451	28,585	1,995,436
Santiago del Estero	757,352	252,564	60,543	35,144	741,909	775,895	90,028	2,713,435
Tucuman	358,923	109,012	46,425	10,975	129,191	108,127	74,886	837,539
Mendoza	226,749	139,575	37,044	8,360	298,487	195,327	65,206	970,748
San Juan	63,286	46,933	25,741	10,711	65,329	81,846	20,578	314,424
La Rioja	211,729	51,034	20,429	32,376	93,829	332,083	9,394	750,874
Catamarca	277,773	60,074	17,398	28,537	182,374	431,472	17,147	1,014,775
Salta	616,080	104,607	24,583	22,219	322,965	328,807	48,406	1,467,667
Jujuy	134,026	33,103	8,018	45,640	575,757	125,911	9,335	931,790
Chaco	455,684	27,475	2,043	450	30,094	14,914	11,225	541,885
Chubut	135,822	106,724	2,188	149	2,047,037	34,670	3,267	2,329,857
Formosa	379,092	21,601	2,297	350	33,010	36,328	4,083	476,761
La Pampa	561,284	364,791	23,447	2,770	2,282,823	88,682	94,192	3,417,989
Los Andes	929	124	2,651	9,128	85,355	29,011	23	127,221
Misiones	91,084	26,932	2,073	422	12,456	6,516	20,866	160,349
Neuquen	152,333	90,555	7,996	926	792,417	325,797	3,642	1,373,666
Rio Negro	90,957	157,546	5,046	823	2,802,282	104,499	7,769	3,168,922
Santa Cruz	43,521	50,002	435	27	3,940,616	1,005	1,016	4,036,622
Tierra del Fuego	6,346	5,073	34		784,183	12	266	795,914
Total Republic	25,866,763	8,323,815	565,069	260,157	43,225,452	4,325,280	2,900,585	85,467,121

[1] There are 14 Provinces, 10 Territories and 1 Federal capital in Argentina.

TABLE 16.—*Most important livestock provinces in Argentina, census of 1914*

Kind	Rank	Provinces and territories	Number	Percentage of total for the Republic
Cattle	1	Buenos Aires	9,090,536	35.2
	2	Corrientes	3,543,395	13.7
	3	Santa Fe	3,179,260	12.3
	4	Cordoba	2,540,313	9.8
	5	Entre Rios	2,334,372	9.0
Total, 5 leading Provinces			20,687,876	80.0
Horses	1	Buenos Aires	2,784,576	33.4
	2	Cordoba	1,228,229	14.8
	3	Santa Fe	1,097,277	13.2
	4	Entre Rios	657,723	7.9
	5	Corrientes	547,440	6.6
Total, 5 leading Provinces			6,315,245	75.9
Mules	1	Cordoba	138,145	24.5
	2	Santiago del Estero	60,543	10.7
	3	San Luis	52,748	9.3
	4	Tucuman	46,425	8.2
	5	Mendoza	37,044	6.6
Total, 5 leading Provinces			334,905	59.3
Asses	1	Jujuy	45,640	17.5
	2	Santiago del Estero	35,144	13.5
	3	La Rioja	32,376	12.4
	4	Catamarca	28,537	11.0
	5	Cordoba	20,188	7.8
Total, 5 leading Provinces			161,885	62.2
Sheep	1	Buenos Aires	18,776,260	43.4
	2	Entre Rios	4,304,305	10.0
	3	Santa Cruz	3,940,616	9.1
	4	Rio Negro	2,802,282	6.5
	5	Corrientes	2,348,584	5.4
Total, 5 leading Provinces			32,172,047	74.4
Goats	1	Santiago del Estero	775,895	17.9
	2	Cordoba	736,342	17.0
	3	San Luis	473,451	11.0
	4	La Rioja	332,083	7.7
	5	Salta	328,807	7.6
Total, 5 leading Provinces			2,646,578	61.2
Swine	1	Buenos Aires	1,394,042	48.1
	2	Santa Fe	474,326	16.3
	3	Cordoba	333,793	11.5
	4	Entre Rios	112,007	3.9
	5	La Pampa	94,192	3.2
Total, 5 leading Provinces			2,408,360	83.0

TABLE 17.—*Principal breeds of purebred animals, census of 1914*

CATTLE

	Bulls	Cows for breeding	Milk cows	Total
Durham	46,483	157,051	24,744	228,278
Hereford	10,384	20,326	1,839	32,549
Polled Angus	3,684	12,971	315	16,970
Jersey	258	261	848	1,367
Holstein	125	187	222	534
Swiss	17	8	45	70
Other	895	2,000	1,274	4,169
Total	61,846	192,804	29,287	283,937

HORSES

	Stallions	Mares	Total
Clydesdale	3,927	9,671	13,598
Percheron	5,697	12,486	18,183
Norman	1,099	2,241	3,340
Hackney	2,440	4,067	6,507
Yorkshire	634	1,246	1,880
Suffolk	465	988	1,453
Arab	997	1,534	2,531
Hunter	138	196	334
Other	3,366	5,291	8,657
Total	18,763	37,720	56,483

SHEEP

	Rams	Ewes	Total
Rambouillet	16,908	140,068	156,976
Lincoln	48,531	377,376	425,907
Southdown	1,865	12,673	14,538
Shropshire	2,151	17,931	20,082
Leicester	463	4,841	5,304
Other	7,059	16,126	23,185
Total	76,977	569,015	645,992

SWINE

	Boars	Sows	Pigs	Total
Berkshire	6,973	15,289	16,259	38,521
Leicester	764	1,311	1,200	3,275
Yorkshire	2,990	5,203	6,215	14,408
Poland-China	600	1,258	1,196	3,054
Large Black	902	1,987	1,089	3,978
Duroc-Jersey	41	122	193	356
Other	317	491	492	1,300
Total	12,587	25,661	26,644	64,892

TABLE 18.—*Number of animals slaughtered by the packing houses*

	1919	1920	1921	1922	1923
Total slaughter:					
Cattle	2,342,317	1,715,269	1,549,665	2,230,780	3,337,597
Sheep	2,550,672	3,277,257	3,793,807	4,769,393	4,335,839
Swine	212,129	334,135	287,124	290,829	140,257
For export:					
Cattle	2,019,916	1,416,745	1,269,399	1,726,154	2,663,000
Sheep	2,146,092	2,553,021	3,128,164	4,340,934	4,072,979
Swine	179,259	283,530	227,740	250,824	88,828
For consumption:					
Cattle	322,401	298,523	280,266	504,626	674,597
Sheep	404,582	724,236	665,643	428,459	262,860
Swine	32,870	50,605	59,384	40,005	51,429

The number of meat animals slaughtered annually on farms and ranches and by municipal slaughterhouses for local consumption is not known, but it is large, as the per capita consumption of meat in Argentina is exceptionally great.

TABLE 19.—*Consumption of meat animals in the city of Buenos Aires*

	1919	1920	1921	1922	1923
Cattle	627,642	602,765	780,282	1,202,755	1,490,863
Sheep	1,186,617	1,349,526	1,348,991	1,049,061	791,213
Swine	165,779	205,459	249,927	228,502	254,728

TABLE 20.—*Meats: Exports from Argentina, 1919–1924*

(Thousands of pounds—000 omitted)

	Year ended December 31—					
	1919	1920	1921	1922	1923	1924
Beef:						
Frozen	877,984	806,052	532,129	348,898	474,683	802,924
Chilled	5,468	111,731	327,132	544,109	720,657	812,115
Dried and salt [1]	17,603	5,577	5,855	13,366	1,202	447
Mutton, frozen	125,131	122,446	145,118	180,103	178,784	184,311
Pork:						
Frozen	9,915	27,485	16,012	16,870	4,020	260
Bacon	1,507	398	26	56	11	3
Hams	784	73	36	48	67	82
Unclassified meats:						
Frozen	48,600	45,291	40,975	45,917	61,665	84,699
Preserved	273,979	30,968	35,097	80,953	176,639	179,538
Meat extract	1,796	351	216	2,362	3,422	4,988
Frozen tongue	503	617	667	105	(2)	
Preserved tongue	4,360	2,336	1,436	1,538	2,000	2,757

[1] Includes some salt pork.

[2] Less than 500.

Compiled from Anuario del Comercio Exterior de la Republica Argentina, 1920 and 1923, and Boletin Mensual de Estadistica Agro-Pecuaria, Dec. 1924.

TABLE 21.—*Argentina: Exports of frozen and chilled beef, 1899–1924*

(Thousands of pounds—000 omitted)

Year ending December 31	United Kingdom	United States	Other countries	Total	Year ending December 31	United Kingdom	United States	Other countries	Total
1899	20,016			20,016	1912	723,836		32,012	755,848
1900	54,212			54,212	1913	782,770	7,162	17,458	807,390
1901	95,892		3,104	98,996	1914	679,570	130,780	3,078	813,428
1902	119,934		34,428	154,362	1915	659,448	88,324	51,920	799,692
1903	133,632		46,088	179,720	1916	790,124	19,488	133,294	942,906
1904	179,698		35,788	215,486	1917	625,224	3,072	242,162	870,458
1905	281,556		55,440	336,996	1918	612,418	1,536	478,678	1,092,632
1906	300,938		38,148	339,086	1919	646,376	4,036	233,040	883,452
1907	289,716		15,008	304,724	1920	771,202	14,264	132,316	917,782
1908	391,366		7,260	398,626	1921	795,766	368	63,126	859,260
1909	461,918		2,496	464,414	1922	833,969	3,040	55,997	893,006
1910	555,904		3,420	559,324	1923	1,026,768	1,413	167,160	1,195,341
1911	663,574		26,100	689,674	1924	1,153,758	5,384	508,021	1,667,163

Compiled from Anuario del Comercio Exterior de la Republica Argentina 1899–1923, and Estadistica Agro-Pecuria, Boletin mensual de Dec., 1924.

TABLE 22.—*Wool washed in Argentina*

Year	Grease wool washed	Washed wool obtained	Percentage washed of grease	Year	Grease wool washed	Washed wool obtained	Percentage washed of grease
	Metric tons	*Metric tons*	*Per cent*		*Metric tons*	*Metric tons*	*Per cent*
1919	27,681	12,366	44.7	1921	18,423	9,811	53.3
1920	18,485	10,034	54.3	1922	25,675	12,640	49.2

NOTE.—1 metric ton=2,204.6 pounds.

TABLE 23.—*Exports of wool*

(Thousands of pounds—000 omitted)

Year	Grease wool	Washed wool	Total	Year	Grease wool	Washed wool	Total
1914	258,533		258,533	1919	309,069	30,139	339,208
1915	259,393		259,393	1920	208,518	13,056	221,574
1916	259,387	8,602	267,989	1921	354,528	11,512	366,040
1917	280,937	17,833	298,770	1922	387,930	14,758	402,688
1918	229,027	27,584	256,611				

The average weight of fleece is estimated at from 7 to 8½ pounds.

TABLE 24.—*Dairy production*

	1910	1920	1921
Number of milk cows (estimated)	2,500,000	2,431,000	3,294,987
Number of creameries	511	1,608	1,592
Milk utilized in creameries—galls	75,282,307	218,603,655	229,885,600
Butter produced in creameries—lbs	16,612,434	63,189,134	72,275,282
Cheese produced in creameries—do	6,043,172	55,564,374	52,251,077
Casein produced in creameries—do		21,047,316	22,040,000

TABLE 25.—*Butter, cheese, and casein: Exports from Argentina, 1910–1924*

(Thousands of pounds—000 omitted)

Year ended December 31—	Butter	Cheese	Casein	Year ended December 31—	Butter	Cheese	Casein
	Lbs.	*Lbs.*	*Lbs.*		*Lbs.*	*Lbs.*	*Lbs.*
1910	6,342	1	6,554	1918	41,821	14,177	7,857
1911	3,077	1	4,780	1919	44,881	19,562	23,602
1912	8,106	4	7,717	1920	47,368	13,575	20,939
1913	8,343	16	7,597	1921	56,905	14,333	18,665
1914	7,676	8	6,449	1922	53,977	14,829	22,123
1915	10,191	13	5,749	1923	72,337	12,685	24,976
1916	12,502	502	6,507	1924	66,211	3,023	33,977
1917	21,672	6,015	10,751				

Source: 1910–1914—Anuario de la Direccion General de Estadistica, 1914. 1915–1920—Anuario del Comercio Exterior, años 1916–1923. 1924—Estadistica Agro-Pecuaria—Boletin Mensual de Dec. 1924.

TABLE 26.—*Comparative freight rates to England in 1923*

From	Rates per ton	Percentage compared with United States	From	Rates per ton	Percentage compared with United States
	Dollars	*Per cent*		*Dollars*	*Per cent*
United States	11.60	100	India	46.41	400
Argentina	26.69	230	Australia	52.21	450

FUTURE OF THE LIVESTOCK INDUSTRY

CATTLE

The census of December, 1922, showed 37,064,850 head of cattle in the Republic, which was probably slightly under the real number. Of this number, it was estimated that about 3 per cent were pure-bred, mostly Shorthorn, with some Hereford, Polled Angus, and other breeds (see fig. 5). About 30 million were found in the six principal agricultural Provinces of Buenos Aires, Entre Rios, Santa Fe, Corrientes, Cordoba, and the Territory of La Pampa, a prairie region about as large, with soils as fertile, and having a climate less severe than the six States of Ohio, Indiana, Illinois, Iowa, Kansas, and Nebraska. On January 1, 1923, it was estimated that these six States had about 17,285,000 head of cattle. Therefore, the agricultural region of Argentina already has about 73 per cent more cattle than a similar area in the Corn Belt of the United States. It does not seem probable that the number of beef cattle will increase materially in Argentina. On the contrary, the total number will probably decrease as more of the virgin lands are brought under cultivation. The quality of the cattle will improve not only by breeding, but by better methods, such as providing some shelter and feed for the short periods of severe winter weather that are occasionally experienced, finishing beef cattle with surplus corn, and making better provision for water in years of severe drought.

Dairying will probably continue to increase. The increase has been rapid in recent years and the relative experience of the cattlemen and dairymen following the slump in the price of beef cattle was a demonstration and an object lesson that will not soon be

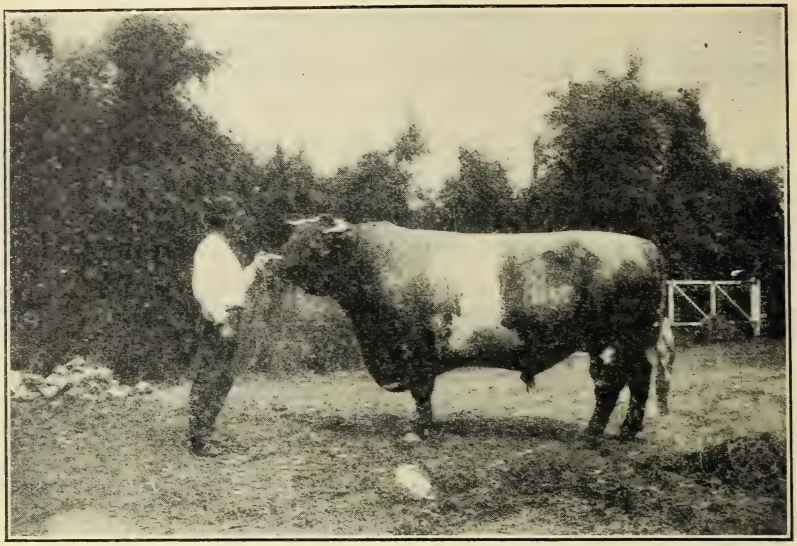

FIG. 5.—A prize Shorthorn bull, Estancia Guanaco, Province of Buenos Aires, Argentina, 1923. This bull was purchased for about $45,000

FIG. 6.—Fat cattle at a rural society show in North Central Argentina

forgotten. During the years when the cattlemen were in great distress, the dairymen continued to prosper. Cost of production of both beef cattle and dairy products is relatively low because of cheap land and labor, a fertile soil, and a mild climate. If, with the increase in population, dairy production should become general throughout the agricultural Provinces on anything like the scale already developed in a few counties of Santa Fe and Buenos Aires, the total production would exceed that of the United States.

Horses

The total number of horses in Argentina in 1914 was reported to be 8,324,000. Of this number, more than 6,000,000 were in the 5 principal agricultural Provinces, as compared with 5,750,000 in the Corn Belt States of Ohio, Indiana, Illinois, Iowa, Kansas, and

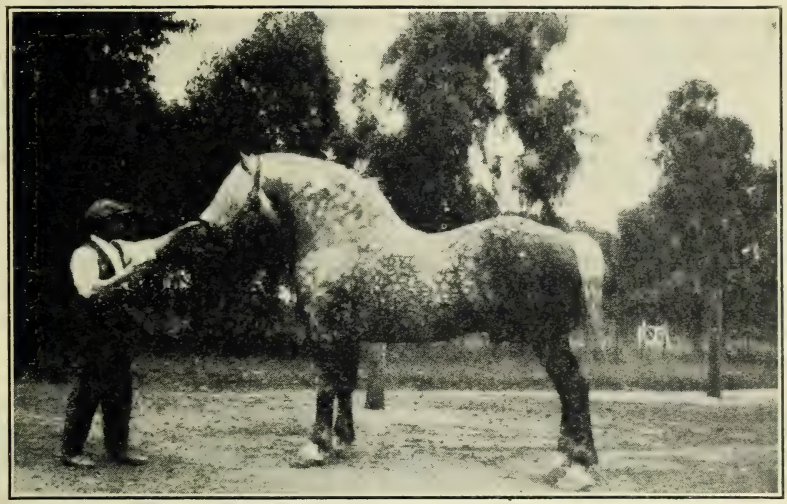

Fig. 7.—Purebred Percheron at the Estancia Guanaco, Province of Buenos Aires, 1923. Much attention is given to the breeding of heavy horses—Percherons, Clydesdales, and Belgians—for draft purposes

Nebraska in January, 1923. About 50 per cent of the Argentine horses are reported to be of pure or mixed breed, but this is probably an overestimate. Of the purebred animals, the heavy Percherons, Clydesdales, and Normans predominate. (See fig. 7.) There are some Hackneys for driving and Arabs for the saddle and polo. The native horses are similar to the Texas ponies and possess some excellent qualities, such as hardiness and great endurance, but they are small in size and weight.

It is not likely that the number of horses in Argentina will increase, but rather that their number will decrease and their quality improve. Motor trucks are already invading the cities and in time will probably displace draft horses as in the United States. With the building of good roads, motor trucks will probably displace also the present system of hauling grain from the fields to the shipping stations in large wagons, the motive power of which is a team of 10 to 20 horses each. Good roads will also tend to increase the number of automobiles at the expense of saddle and driving horses. On the large estates,

which predominate in Argentina, herds of horses are kept on pasture. When needed for work it is the custom to round up a drove in the morning and work them in two shifts without feed, one shift in the forenoon and the other shift in the afternoon. This is an inexpensive method and is possible only where large areas of pasture are available and large numbers of small animals are required. As the quality of the horses improves by breeding the heavier types, fewer animals will be needed. Although the agricultural region of Argentina is ideal for the use of tractors, they can not at present compete with horsepower that costs nothing but pasturage.

Mules

The conditions in Argentina are ideal for the breeding of mules, because of the abundance of mares and pasturage, but they have never been popular because of the number of cheap horses. In 1914, there were little more than 500,000 mules in the country. About 60 per cent of the mules are in the Provinces of Cordoba, Santiago del Estero, San Luis, Tucuman, and Mendoza, where the hardiness of the mule makes him of value. Large areas of these Provinces are semiarid, mountainous, crops are grown under irrigation, pasturage is scarce, and the mule is more economical than the horse in the irrigated sections and in the mountainous country. Mules at present are bred from pony stock and are diminutive in size. Because of the favorable conditions in Argentina it would seem that the raising of mules, bred for size and form for the export trade, would prove a profitable industry. Unless a better market develops for mules, it is not likely that they will increase in Argentina.

Sheep

As in many other countries, sheep production has tended to decrease in Argentina since 1895, when the total number was estimated to be about 74,000,000. This number decreased to 67,000,000 in 1908, to 43,000,000 in 1914, and to 31,000,000 in 1922, although this latter figure is believed to be an underestimate. The decline in numbers has been most pronounced in the agricultural Provinces, indicating that sheep raising on the prevailing share system is less profitable than the raising of beef cattle and crops. It seems probable that as population increases, as estates are subdivided, and as more of the virgin prairie is brought under cultivation, the number of sheep in the agricultural region will continue to decline, and their quality to improve. In the outlying Provinces and Territories where conditions are less favorable for agriculture, sheep production will be largely influenced by the same factors as in the United States, that is, by the future trend of prices for wool and mutton.

Goats

The goat is the hardiest of the domestic animals and is more profitable in semiarid and mountainous regions, where other domestic animals can not thrive. For this reason, of the 4,333,000 goats estimated to be in Argentina in 1914, the greater proportion was found in the semiarid Provinces and Territories. It seems probable that as this situation has existed for many decades, it will continue

and the number of goats will remain practically stationary in future. They subsist under rather severe conditions of scanty pasturage and water supply, and a topography unsuited for other forms of livestock or agriculture. It is not likely, therefore, that the goat-raising industry of Argentina will be materially affected by changes that other industries may undergo.

Swine

Swine are not popular in Argentina. They require too much feed and too much attention and manual labor to compete with either beef cattle or sheep in a country of large estates, underpopulated, and with less than 8 per cent of the total area in cultivation. The census figures show that there are fewer swine in Argentina than any other kind of domestic animal and that the number has not increased since 1908, but actually decreased from 2,900,585 in 1914, to 1,436,638 in 1922.

The practice of pasturing swine on alfalfa and of hogging down corn is not yet generally known or practiced in Argentina, although the economy and profitableness of these methods have been fully demonstrated on a large scale on one group of ranches in the Province of Buenos Aires, where American varieties of corn and hogs are grown on the same system as that followed on some of the larger farms in Illinois and Iowa. With increase in population, subdivision of the large estates and increased production of corn and other feed in the strictly agricultural region, great expansion in the production of swine in Argentina may be expected.

Viewing the livestock industry as a whole, the statistics show that the number of domestic animals, especially cattle, sheep, and horses, increased greatly following the fencing of the Pampa country and the subjugation of the Indians and other marauders in the last half century. During this period, the quality of the livestock was greatly improved by the introduction of purebred sires from abroad. It is said that the Argentine breeders pay the highest prices in the world for prize purebred animals. Many of the estancias are princely estates, models of their kind not only for the uniformly high grade of the purebred livestock produced by them (fig. 8), but for their equipment, organization, business management, and modern methods. The livestock exposition held annually at Buenos Aires is surpassed by few or none in the world for the number and quality of the purebred animals on exhibition and the nation-wide interest displayed in them.

The livestock industry of Argentina has the advantage of large areas of rich soil, excellent pasturage, a winter climate so mild as not to require artificial shelter or feed, relatively cheap land and labor, and nearness to seaport (fig. 9), but with the disadvantage of a relatively small population, limited domestic consumption, and high ocean freight rates to distant markets. The future of the livestock industry in Argentina will be influenced largely by increase in population, subdivision of large estates, and the expansion of agriculture, as well as by the trend of future foreign demand and prices.

CROPS

Until recent years the development of crop production in Argentina was comparatively slow. Indians who occupied the country

FIG. 8.—A typical herd of cattle on a large estate of Argentina

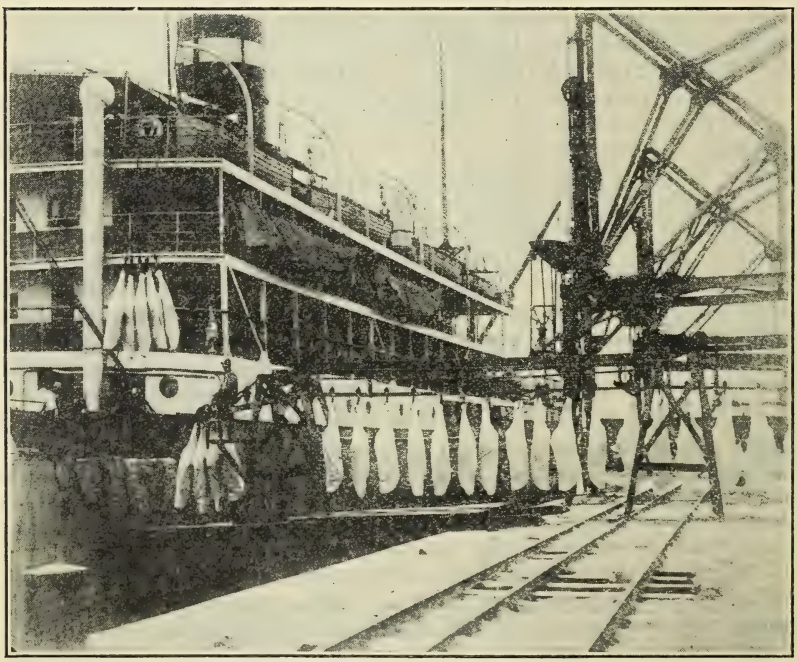

FIG. 9.—Loading export beef onto an ocean-going steamer at Buenos Aires

before the coming of the Spanish explorers in the sixteenth century were hunters and meat eaters. They had no agriculture except small plots of corn and beans and a few other vegetables in garden patches

along the rivers and streams, especially in the mountains from Cordoba north and along the eastern slopes of the Andes. In this region some of the methods of growing crops under irrigation that had been developed by the Incas in Peru were followed. The first

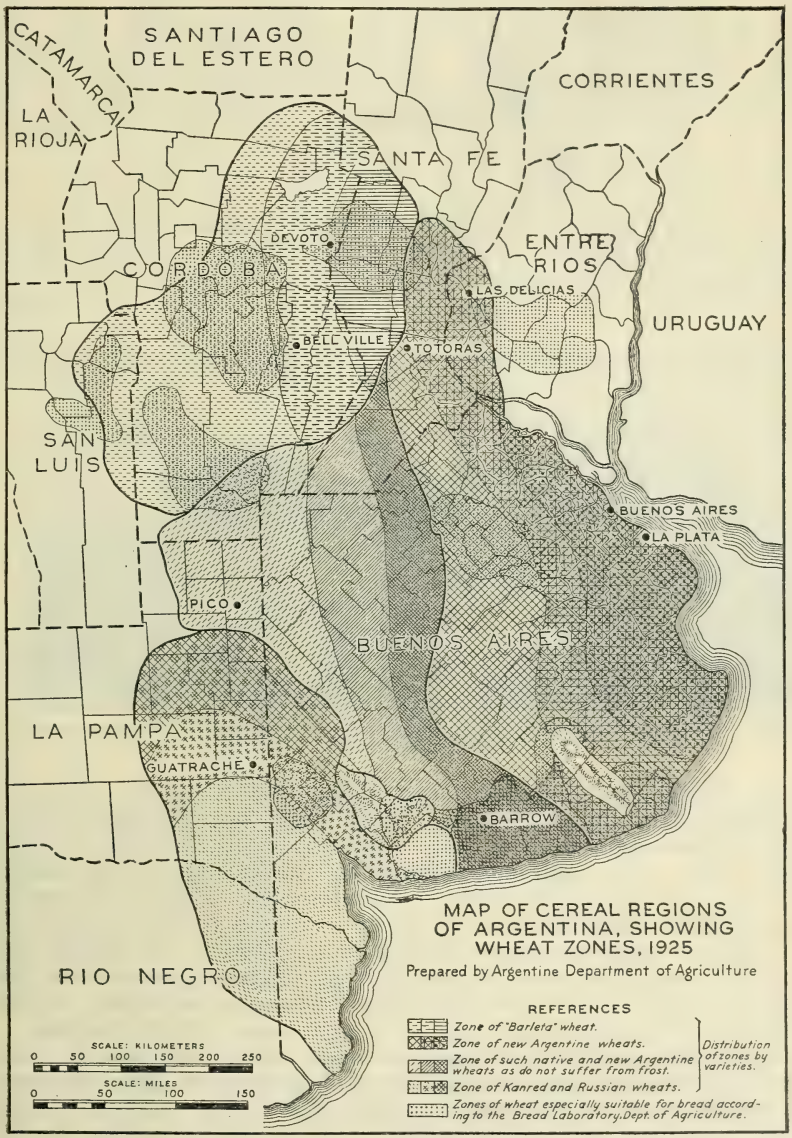

FIG. 10.—Many kinds of wheat flourish in Argentina

colonists from Spain brought with them domestic animals and seeds. The animals multiplied with little or no attention and in a short time great herds roamed the prairies in a half-wild state. The seeds were planted in garden patches about the small settlements, but for

several generations the colonists lived almost exclusively on a meat diet, there being insufficient wheat grown in the country for bread.[9]

About the time Argentina overturned the local Spanish Government at Buenos Aires, 1810, Juan Manuel de Rosas, who later became dictator (1832–1852) first began to grow wheat on a large scale in the Province of Buenos Aires. Although natural conditions were exceptionally favorable, the population was small, the areas were vast, fencing material, transportation, and markets were lacking, the Spaniards appeared to have a hereditary preference for livestock, and the Indians were hostile, so that Argentina did not produce sufficient wheat for its own consumption until about 1876.

During the last quarter of the eighteenth century there was some development in the north and northwestern Provinces in the production of cotton, rice, tobacco, wine grapes, sugar cane, and other crops, but these infant industries received a severe check after certain restrictions on importations from foreign countries were removed in 1778, and conditions were not propitious for their further develop-

FIG. 11.—Harvesting wheat with a combined header and thresher in southern Cordoba, Argentina, January, 1924

ment during the unsettled times from 1810 to 1880. Railroad construction began in a small way in 1857, but proceeded slowly until in 1884 there were 11 lines in operation with a total length of 1,400 miles. The railroads opened up the interior to settlement and gave an outlet for agricultural products. During the period from 1874 to 1884 the area in wheat increased from 271,000 acres to 1,717,000 acres, or about 533 per cent. During the same period the total area in all crops increased from 825,000 acres to 4,260,000 acres, or about 416 per cent. Exports of wheat first exceeded 100,000 bushels in 1882, when the total net exports were 108,560 bushels.

Agricultural development has been most rapid in the region within a radius of 350 to 400 miles of the city of Buenos Aires, which is the humid portion of the Pampa comprised in the Provinces of Buenos Aires, Entre Rios, Sante Fe, Cordoba, and the Territory of La Pampa. In this region more than 90 per cent of the total crops and livestock of the Republic are produced. It is within this region also that the

[9] Azara, Felix de. Viajes por América meridional. Madrid, Calpe, 1923. t. 1-2. Viajes clasicos López, V. F. Manual de la historia Argentina. Buenos Aires, Administración general Vaccaro; 1920. La cultura Argentina Tornquist, Ernesto & cía, limitada, Buenos Aires. The economic development of the Argentine Republic in the last 50 years. Buenos Aires, 1919.

greatest agricultural development may be expected in future. (See figs. 11 and 12.) Agricultural production is permanently limited to this region on the east by Uruguay and the Atlantic Ocean; on the south and west by semiarid conditions; on the north by a subtropical climate—a portion of which is subhumid—less fertile soils, belts of timber and marsh, more numerous insect pests, lack of population and schools, and other primitive pioneer conditions. Mainly for this reason the statistics of agricultural production have been limited in the past to the five or six principal agricultural Provinces.

Cereals

The following statistics (Tables 27 to 32 inclusive) relate (1) to the Republic as a whole, (2) to the five principal Provinces of the cereal region, and (3) to the most important crops grown in other regions. It should be understood that the statistics here given are largely estimates, although some of them are labeled "Census;" but they are the best obtainable and are believed to be sufficiently accurate for use as index numbers:

TABLE 27.—*Estimated average acreage, yield, production, and exports of cereals and other crops in Argentina, 1917–18 to 1921–22*

Crop	Acreage			Units	Yield per acre	Production	Exports
	Planted	Percentage of all crops planted	Harvested				
	Acres	*Per cent*	*Acres*				
Wheat	15,744,000	28.6	14,946,000	Bushel	13.1	192,167,000	131,568,000
Corn	8,114,000	14.8		Bushel	24.3	211,670,000	103,949,000
Flaxseed	3,407,000	6.2	3,317,000	Bushel	11.8	39,194,000	36,098,000
Oats	2,529,000	4.6	1,432,000	Bushel	29.9	42,829,000	27,082,000
Barley	625,000	1.1	200,000	Bushel	16.3	3,273,000	1,554,000
Rye	237,000	.4	94,000	Bushel	9.9	922,000	477,000
Alfalfa	21,459,000	39.0					
Sugar cane	234,000	.4		Ton	40	208,467	
Peanuts	104,000	.2		Pound	979	101,823,000	
Cotton	38,000	.1		Pound	720	27,374,000	
Tobacco	26,000	.1		Pound	1,068	27,768,000	
Alpiste (canary seed)	54,000	.1					
Potatoes	351,000	.6					
Beans	80,000	.2					
Vegetables	160,000	.3					
Grapes	288,000	.5					
Mandioca	38,000	.1					
Yerba mate	14,000						
Caster beans	6,000						
Other crops and planted trees	1,507,000	2.7					
Total cultivated area	55,015,000	100.0					

Oats, barley, and rye are generally sown in the fall for pasture during the winter months. The area harvested depends entirely upon conditions the following spring. Very little alfalfa is cut for hay. Average production figures are lacking for other crops prior to 1924. The last item "Other crops and planted trees" refers especially to orchards and considerable areas planted to forest trees for shade, shelter, and fuel.

TABLE 28.—*Population in the cereal provinces, census of 1914*

Province	Inhabitants	Persons engaged in			
		Agriculture and livestock industries		Other occupations	
	Number	*Number*	*Per cent of total*	*Number*	*Per cent of total*
Buenos Aires	3,642,762	132,729	3.6	2,260,988	62.1
Cordoba	735,472	73,543	10.0	376,071	51.1
La Pampa	101,338	11,112	11.0	48,769	48.1
Santa Fe	899,640	72,060	8.0	495,753	55.1
Entre Rios	425,373	31,460	7.4	218,597	51.4
Total	5,804,585	320,904	5.5	3,400,178	58.6

These Provinces contain 72 per cent of the total population of the republic (8,092,216).

FIG. 12.—Harvesting wheat in the wheat belt of the Pampas

TABLE 29.—*Crop and livestock establishments in Argentina, census of 1914*

Province	Total area	Crop and livestock establishments	Average size of establishment	Persons engaged in agricultural and livestock industries	Average persons per establishment	Average area per person
	Acres	*Number*	*Acres*	*Number*	*Number*	*Acres*
Buenos Aires	75,410,000	25,000	3,016	132,729	5.3	568
Cordoba	42,847,000	12,400	3,455	73,543	5.9	583
La Pampa	36,039,000	2,000	18,020	11,112	5.6	3,243
Santa Fe	32,451,000	13,200	2,458	72,060	5.5	450
Entre Rios	18,711,000	6,200	3,018	31,460	5.1	595
Total	205,458,000	58,800	3,494	320,904	5.5	640

These five Provinces contain 28 per cent of the total area of the republic (737,876,000 acres)

TABLE 30.—*Grain farms in cereal region of Argentina, census of 1914*

Province	Area in cereals	Farms	Acreage in cereals per farm
	Acres	*Number*	*Acres*
Buenos Aires	13, 333, 000	17, 400	766
Cordoba	7, 787, 000	7, 200	1, 082
La Pampa	2, 506, 000	1, 200	2, 088
Santa Fe	7, 557, 000	10, 800	700
Entre Rios	2, 304, 000	4, 200	549
Total	33, 487, 000	40, 800	821

TABLE 31.—*Average area, yield, and production in the cereal region of Argentina, 1914–15 to 1923–24, inclusive*

AREA

Cereal	Buenos Aires	Cordoba	La Pampa	Santa Fe	Entre Rios	Total
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Wheat	5, 189, 717	4, 878, 991	2, 149, 641	2, 678, 962	962, 806	15, 860, 117
Corn	3, 462, 199	1, 444, 209	148, 447	2, 562, 378	207, 233	7, 824, 466
Flaxseed	766, 194	883, 766	83, 733	1, 510, 385	783, 237	4, 027, 315
Oats	1, 956, 981	130, 416	202, 293	71, 630	166, 231	2, 527, 551
Barley	234, 403	109, 421	62, 738	82, 004	12, 103	500, 669
Rye	93, 860	67, 925	64, 467	10, 868	988	238, 108
Total	11, 703, 354	7, 514, 728	2, 711, 319	6, 916, 227	2, 132, 598	30, 978, 226

YIELD PER ACRE

	Bushels	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*
Wheat	12. 4	11. 0	9. 5	11. 6	10. 1	11. 3
Corn	26. 0	17. 8	10. 8	26. 4	12. 0	24. 0
Flaxseed	12. 1	6. 9	6. 9	10. 0	9. 1	9. 5
Oats	22. 5	7. 0	9. 2	13. 9	10. 3	19. 6
Barley	12. 8	3. 8	6. 3	4. 0	2. 2	8. 3
Rye	5. 1	4. 2	7. 1	6. 1	13. 2	5. 5

PRODUCTION

	Bushels	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*
Wheat	64, 548, 000	53, 684, 000	20, 324, 000	31, 203, 000	9, 772, 000	179, 531, 000
Corn	90, 000, 000	25, 726, 000	1, 603, 000	67, 702, 000	2, 480, 000	187, 512, 000
Flaxseed	9, 279, 000	6, 088, 000	578, 000	15, 166, 000	7, 109, 000	38, 219, 000
Oats	44, 126, 000	914, 000	1, 869, 000	996, 000	1, 704, 000	49, 608, 000
Barley	3, 000, 000	412, 000	398, 000	330, 000	27, 000	4, 168, 000
Rye	478, 000	283, 000	461, 000	66, 000	13, 000	1, 302, 000

TABLE 32.—*Cereal region of Argentina*

Province	Total acreage	Fertile prairie tillable		Actually cultivated		
				Total	Percentage of total	Percentage of tillable
	Acres	*Per cent*	*Acres*	*Acres*	*Per cent*	*Per cent*
Buenos Aires	75, 410, 000	95	71, 640, 000	13, 204, 000	17. 5	18. 4
Cordoba	42, 847, 000	75	32, 135, 000	7, 642, 000	17. 8	23. 8
La Pampa	36, 039, 000	40	14, 416, 000	3, 047, 000	8. 5	21. 1
Santa Fe	32, 451, 000	80	25, 961, 000	6, 850, 000	21. 1	26. 4
Entre Rios	18, 711, 000	80	14, 969, 000	2, 497, 000	13. 3	16. 7
Total	205, 458, 000	77	159, 121, 000	33, 240, 000	16. 2	20. 9

It is apparent from these figures that the potential cereal acreage is very much greater than the actual area under cultivation. Increased acreage, however, would probably involve a decrease in the alfalfa and other grazing areas, or an extension of the margin of cultivation which would involve greater unit costs.

Production can be still further increased in other Provinces, especially by irrigation. Oats, barley, and rye are at present sown primarily for winter pasturage. When prices are sufficiently high to make them more profitable for grain than for pasturage, the production of grain can be greatly increased. In the column showing percentage of "fertile prairie tillable," liberal allowance has been made for rivers, lagoons, belts of timber, roads, fences, buildings, and land necessary for purposes other than cultivation. Although the areas estimated as tillable in these five Provinces are level, rich, prairie soil, and they could be put into cultivation easily and rapidly by simply plowing under the sod, the maximum potential cereal production can not be reached without subdivision of the land, immigration, and an adjustment with the livestock industry, all of which will probably require many years. With the present population, equipment, and methods, the areas sown to cereal crops could probably be increased 25 to 50 per cent if prices are sufficiently attractive.

Cotton

Cotton has been grown in Argentina at least for a century; but this crop has not prospered because of low prices, lack of markets, high freight rates, and the fact that other crops were more profitable. High prices prevailing since the World War, however, have greatly stimulated interest in cotton and the industry is becoming established. The estimates of area and production (Table 33) are taken from "La Industria Algodonera en la Argentina," by E. J. Schleh, 1923, pages 13 and 50.

Table 33.—*Cotton: Estimates of area and production, 1912–1924*

Year	Acreage	Production of seed cotton	Production of lint cotton	Yield of lint cotton per acre
	Acres	*Pounds*	*Pounds*	*Pounds*
1912	6,916	5,511,500	1,653,450	239.1
1913	5,476	4,409,200	1,322,760	241.6
1914	8,151	6,613,800	1,984,140	243.4
1915	9,114	7,275,180	2,182,554	239.5
1916	7,595	6,172,880	1,851,864	243.8
1917	29,084	23,368,760	7,010,628	241.0
1918	32,443	26,014,280	7,804,284	240.6
1919	32,774	26,455,280	7,936,560	242.2
1920	58,934	47,398,900	14,219,670	241.3
1921	38,569	30,864,400	9,259,320	240.1
1922	56,474	45,194,300	13,558,290	240.1
1923	150,000			
1924	250,000			

TABLE 34.—*Distribution by Provinces in 1922*

[Direccion de Economia Rural y Estadistica]

Province	Percentage of total acreage
Chaco	86.3
Corrientes	10.4
Formosa	2.0
Santiago del Estero	1.3
Total	100.0

During the last two years the Argentine Department of Agriculture has systematically encouraged the growing of cotton and has distributed large quantities of seed. In 1924 two experienced cotton specialists from the United States were employed, N. E. Winters as director of the National Cotton Experiment Station at P. Roque Saenz Pena, Chaco, and Ernest L. Tutt as director of the commercial cotton division at Santa Fe. The area planted to cotton in 1924 for the 1925 crop has been increased to about 250,000 acres. New modern gin equipment has been provided for handling increased production, the industry is becoming well established, and there is every prospect that the area in production will continue to increase.

Cotton can be grown throughout the northern third of Argentina, more especially the eastern half of this region where the rainfall is ample. The western half of the northern third is semiarid and mountainous and irrigation is practicable only along the streams. The eastern half referred to, which includes the Provinces of Corrientes and Misiones east of the Parana River, and west of the river the Territories of Chaco and Formosa, the northern third of the Province of Santa Fe, and a large part of the Province of Santiago del Estero, is especially adapted to growing cotton. The climate and soils are similar to those of Mississippi, Louisiana, and Texas.

Table 35 shows the size of this region in comparison with some of our own States.

TABLE 35.—*Size of cotton area as compared with certain of our own States*

Argentina		United States	
Provinces	Total area	States	Total area
	Acres		*Acres*
Corrientes	21,958,000	South Carolina	19,516,800
Santa Fe	32,451,000	Alabama	32,818,560
Chaco	33,748,845	Arkansas	33,616,000
Santiago del Estero	35,440,548	Florida	35,111,040
Formosa	26,492,726	Tennessee	26,679,680
Misiones	7,366,034	Maryland	6,362,240
Total	157,457,153		154,104,320

This total of 157,000,000 acres in Argentina may be compared with the State of Texas which has an area of 167,935,000 acres, of which 16,198,000 acres were devoted to cotton in 1924 with an estimated production of 4,770,000 bales.

The advantages of the region are a favorable climate, fertile soil, cheap land, cheap labor, and water transportation (the Pilcomayo, Bermejo, Parana, and Paraguay Rivers). At present there is an abundant supply of native and Indian labor, but any considerable increase in area and production will necessitate immigration. The disadvantages are the lack of cotton gins in some districts, lack of a ready and wide market (due in the past to the small quantity produced), small proportion of cultivated land (probably less than 5 per cent, lack of forage for work animals, lack of labor familiar with cotton growing and picking, remoteness from centers of population and the fact that the land along the rivers and railroads is mostly held in large tracts by private owners; also the fact that the pink bollworm is widely distributed throughout the cotton region and the locusts often devour the young cotton, making replanting one or more times necessary. Both insects are serious pests. The boll weevil has not yet appeared in the cotton fields of Argentina, although it has been found in seed imported from the United States.

FIG. 13.—Sugar-cane field and irrigation ditch, Province of Tucuman, Argentina, June, 1924

In the western half of the northern third of the country the sections suitable for growing cotton are generally limited to relatively small areas of irrigated land in the valleys and along the streams. As other crops, such as sugar cane, rice, wine grapes, and fruits, are all well established in these sections, and as they are widely scattered and remote from the ports, it does not seem probable that cotton growing will develop to any large extent in them by displacing other crops already established.

SUGAR CANE

The climate and soil of the northern third of Argentina are adapted to sugar-cane culture. Sugar cane has been grown in portions of this region for more than a century, but has reached its greatest development since 1895. The industry is mainly concentrated in the irrigated section of the Province of Tucuman and to a much smaller extent in

the Provinces to the north of Tucuman, Salta, and Jujuy, and to the east, Sante Fe, Chaco, and Corrientes (see fig. 13). The increase in the total area in sugar cane is shown by Table 36.[10]

TABLE 36.—*Trend of acreage in sugar cane and of sugar produced*

Year	Sugar cane	Sugar produced	Year	Sugar cane	Sugar produced
	Acres	*Metric tons*		*Acres*	*Metric tons*
1872	6,059	1,400	1915	317,395	149,299
1888	52,023		1917	230,476	80,088
1898	119,672	75,538	1918–22 (average)	234,000	208,467
1908	174,656	161,688			

TABLE 37.—*Distribution of sugar production by Provinces*

Provinces	1918–19	1919–20	1920–21	1921–22	1922–23
	Metric tons	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*
Tucuman	86,561	250,977	165,008	158,954	182,374
Jujuy	35,266	38,358	28,939	23,230	21,644
Salta	1,444	1,881	3,586	5,079	5,878
Santa Fe	317	912	10,394	1,735	1,379
Corrientes	433	603	559	272	495
Chaco	1,926	4,195	1,167	2,029	4,689
Total	125,947	296,926	209,653	191,299	216,459

TABLE 38.—*Distribution of the sugar industry by Provinces, census of 1914*

Provinces	Establishments	Persons employed	Capital invested	Maximum annual production capacity		
				Sugar	Alcohol	Refined sugar
	Number	*Number*	*Dollars*	*Metric tons*	*Gallons*	*Metric tons*
Tucuman	30	9,074	48,176,377	321,570	5,689,600	82,766
Jujuy	3	3,843	19,246,266	78,400	1,974,900	
Salta	1	195	639,636	2,500		
Santa Fe	3	589	6,434,390	3,250	808,500	180,000
Corrientes	1	154	550,680	1,750	118,800	
Chaco	3	645	4,825,143	7,900	211,600	
Formosa	2	184	547,321	2,081	52,800	
Total	43	14,684	80,419,813	417,451	8,856,200	262,766

One of the principal sugar refineries in the country was established in Rosario in the Province of Santa Fe in 1889, and in recent years its equipment has been completely modernized. The same is true of many of the mills in the sugar region. The average yield of cane is from 30 to 40 tons per acre and the average percentage of sugar obtained is 8.5.

Within recent years the native varieties of sugar cane suffered severely from a serious disease which threatened the existence of the industry, but, as the result of the work done by the director of the agricultural experiment station of Tucuman, the native varieties have been practically displaced by disease-resistant varieties from Java. The great variation in the quantity of sugar produced in different years is due to early frosts to which the crop is subject, especially in Tucuman, and to lack of sufficient water for irrigation.

[10] Tornquist, Ernesto & cía, limitada, Buenos Aires. The economic development of the Argentine Republic in the last 50 years. Buenos Aires, 1919; and data furnished by the Argentine Republic. Ministerio de Agricultura. Dirección de Economía Rural y Estadística.

The cost of land and labor is relatively low. The cost of machinery is high because it must all be imported and to the purchase price must be added ocean freight and import duties. Freight rates to consuming centers are so high that Brazilian sugar can be laid down in Buenos Aires cheaper than the sugar of Tucuman. The domestic industry can therefore meet the competition from Brazil only by a protective tariff to equalize the freight factor and by limiting production to the requirements of domestic consumption. The capacity of the sugar mills is already greatly in excess of present production and of domestic consumption.

Grapes

The growing of grapes is of considerable importance in Argentina, in all Provinces and Territories from Rio Negro north; but the industry has reached its greatest development under irrigation in the Provinces of Mendoza and San Juan, at the eastern base of the Andes Mountains. Although the consumption of grapes in season as fresh fruit is large, especially in the cities and towns of the eastern Provinces, the bulk of the crop is utilized for making wine. The total area in vineyards by Provinces and Territories is not accurately known. Tables 39 to 43 show the number of wine-making establishments and the quantity of grapes used in the manufacture of wine; the distribution of the industry, the area and yield per acre of certain vineyards, and prices of varieties.

Table 39.—*Wine-making establishments and production*

Year	Establishments	Grapes utilized	Wine obtained
Average:	*Number*	*Metric tons*	*Gallons*
1907–1911	2,662	433,185	44,841,054
1912–1916	4,267	694,842	125,149,975
1917–1921	4,412	650,868	124,493,755
1922	3,825	687,596	131,522,486
1923	4,447	753,004	143,729,699

Table 40.—*Distribution of wine industry, 1923*

Provinces and Territories	Establishments		Grapes utilized	Percentage of total grapes	Wine produced	Percentage of total wine
	Total	Working				
	Number	*Number*	*Metric tons*	*Per cent*	*Gallons*	*Per cent*
Federal Capital	84	59	5,290	0.7	895,389	0.6
Buenos Aires	413	294	6,948	.9	1,163,083	.8
Mendoza	1,765	1,243	536,770	71.3	105,777,782	73.6
San Juan	436	300	180,198	23.9	31,900,188	22.2
La Rioja	393	177	4,111	.6	621,831	.4
Entre Rios	116	60	1,751	.2	292,556	.2
Santa Fe	134	43	493	.1	79,432	.1
San Luis	66	49	662	.1	100,156	.1
Santiago del Estero	9	1	3		432	
Cordoba	334	250	3,782	.5	660,285	.4
Catamarca	361	102	1,617	.2	251,478	.2
Salta	114	59	2,566	.4	402,457	.3
Corrientes	13	5	12		1,770	
Jujuy	28	21	951	.1	166,882	.1
Tucuman	13	2	14		2,377	
Rio Negro	168	115	7,836	1.0	1,413,601	1.0
Total	4,447	2,780	753,004	100.0	143,729,699	100.0

Compiled by the statistical bureau of the Argentine Department of Agriculture.

TABLE 41.—*Area in vineyards in Mendoza and San Juan*[1]

Year	Mendoza	San Juan	Total	Year	Mendoza	San Juan	Total
	Acres	*Acres*	*Acres*		*Acres*	*Acres*	*Acres*
1912–13	133, 874	61, 750	195, 624	1918–19	174, 404	47, 157	221, 561
1913–14	135, 850	62, 244	198, 094	1919–20	174, 404	46, 930	221, 334
1914–15	180, 058	75, 722	255, 780	1920–21	174, 406	46, 930	221, 336
1915–16	180, 310	54, 340	234, 650	1921–22	177, 605	54, 834	232, 439
1916–17	172, 900	54, 340	227, 240	1922–23	184, 835	54, 834	239, 669
1917–18	174, 382	54, 340	228, 722				

[1] Provinces of largest production.

TABLE 42.—*Average yields per acre of principal varieties of wine grapes grown in one vineyard in San Juan*

Variety	Acreage	Yield per acre			
		1917	1918	1919	Average 1917–1919
	Acres	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Malbeck	300	13, 125	9, 350	13, 205	11, 893
Cabernet	118	5, 595	3, 660	6, 001	5, 085
Semillon	6. 8	8, 644	3, 786	11, 020	7, 817
Criolla	6. 3	13, 798	16, 732	21, 879	17, 470
Italia	9. 0	586	609	1, 139	778
Parral Cereza	7. 6	11, 186	21, 570	24, 111	18, 956
Parral Moscatel	6. 7	29, 106	11, 458	12, 890	17, 818

The two varieties, Cereza and Moscatel, classed as "Parral" (arbor) gave the heaviest yields. This is probably because of the method of growing them on arbors, which is more expensive both in cost of erection and in picking. The usual method is to grow the grapes on wires strung on posts and to prune the vines low. This is an inexpensive method and facilitates cultivation, ripening, and harvesting. Of the varieties grown by this method, the most productive is the Criolla, which is the variety brought over more than a century ago by the early Spanish settlers and is very hardy. Practically all the vines are grafted on phylloxera-resistant stocks.

The average per capita consumption of wine of the Republic is estimated to be about 14 gallons, varying greatly in different Provinces, the lowest being in the Territory of Los Andes, where it is less than 1 gallon, to about 30 gallons per capita in the three southern Territories of Chubut, Santa Cruz, and Tierra del Fuego.

TABLE 43.—*Average prices of wine grapes in San Juan, 1909 to 1923*

Year	Price per metric ton			Year	Price per metric ton		
	French varieties	Native varieties (Criolla)	Weighted average [1]		French varieties	Native varieties (Criolla)	Weighted average [1]
	Dollars	*Dollars*	*Dollars*		*Dollars*	*Dollars*	*Dollars*
1909	18. 00	16. 67	17. 00	1918	21. 33	21. 33	21. 33
1910	23. 34	25. 00	24. 59	1919	21. 67	23. 33	22. 92
1911	31. 00	30. 00	30. 25	1920	40. 00	40. 00	40. 00
1912	31. 00	30. 00	30. 25	1921	26. 67	20. 00	21. 67
1913	23. 34	22. 33	22. 59	1922	15. 00	23. 33	21. 25
1914	13. 33	10. 00	10. 83	1923	30. 00	40. 00	37. 50
1915	10. 00	11. 67	11. 25				
1916	13. 33	10. 00	10. 83	Av., 15 years	22. 33	22. 67	22. 58
1917	17. 33	16. 67	16. 83				

[1] Weighted average price, 25 per cent French, 75 per cent native.

Mendoza and San Juan extend from the Chilean boundary eastward through the Andes Mountains into the plains country. They are naturally semiarid and desert and without irrigation there could be no production. The Mendoza and San Juan Rivers and other small streams furnish a limited supply of water for irrigation. In total area they compare with Michigan and Indiana, as follows: Mendoza 36,155,000 acres, Michigan 36,787,000 acres; San Juan 24,230,000 acres, Indiana 23,069,000 acres.

The distribution of crop production in Mendoza, the most important of the wine-grape producing Provinces of Argentina, was as follows in 1924:

	Acres		Acres
Vineyards	179, 191	Vegetables	8, 618
Alfalfa	290, 445	Olives	1, 761
Corn	69, 402	Peaches	9, 887
Potatoes	25, 201	Pears	1, 186
Barley	12, 968	Nuts	948
Wheat	12, 513	Apples	904
Oats	8, 652	Cherries	766
Flaxseed	1, 452	Plums	1, 680
Canary seed	25	Figs	417
Rye	75	Other fruits	1, 625
Beans	2, 880		
Onions	1, 087	Total	631, 683

It will be observed that less than 2 per cent of the total area of Mendoza is in cultivation and that of the total area cultivated about 46 per cent is in alfalfa and 28 per cent in vineyards.

The price of land in Mendoza and San Juan depends upon whether it is irrigated, the crops to which is it planted, improvements, and distance from shipping station. Land at a distance from the railroad and not irrigated or susceptible of irrigation has little or no value. Producing vineyards are assessed for loan purposes at from $240 to $800 per acre; land in alfalfa from $54 to $340; land set with bearing fruit trees from $30 to $275; and land in miscellaneous crops and vegetables from $30 to $200. Most of the labor necessary for cultivating the vineyards is done under contract, usually about $15 to $20 per acre, in addition to house and garden.

Further agricultural development in the grape-growing region of Mendoza and San Juan will depend upon such additional areas as may be brought under irrigation, market demand for their products, especially wine and fruits, and upon freight rates and improved transportation facilities. The Pacific Railway, which serves both Provinces, estimates that it will be possible to bring under irrigation for dry-land methods of farming 288,000 acres in San Juan and 854,000 acres in Mendoza. This estimate is probably too optimistic. Some fresh fruits have been shipped to Buenos Aires and exported to the United States and Europe, but to expand the export trade in perishable fruits from this region will require the adoption of systematic methods of growing, packing, precooling, and refrigeration. The climatic conditions in Mendoza, San Juan, and other semiarid regions are similar to those in California.

Tobacco

Tobacco has been cultivated in various parts of northern Argentina for more than half a century. In 1904 the area in tobacco was estimated to be as follows:

	Acres
Corrientes	7,410
Salta	4,940
Tucuman	3,705
Catamarca, Chaco, and Misiones	2,470
Other Provinces and Territories	3,705
Total	22,230

The total area and production of tobacco since 1905 has been estimated as shown in Table 44.

TABLE 44.—*Tobacco area and production in Argentina since 1905*

Year	Area	Production	Year	Area	Production
	Acres	*Pounds*		*Acres*	*Pounds*
1906	34,333	8,312,192	1914	37,939	11,590,163
1907	23,581	9,917,760	1915	18,846	9,578,039
1908	23,581	13,750,000	1916	25,490	23,011,556
1909	23,581	21,829,000	1917	26,490	14,182,969
1910	24,221	15,146,760	1918		9,246,743
1911	24,127	12,855,696			
1912	23,850	12,241,435	Average, 1917–18 to 1921–22	26,000	
1913	36,729	11,238,315			

During recent years Argentina has produced about 40 per cent of the tobacco consumed in the country. Climate and soils are favorable for tobacco growing in many sections throughout the northern half of Argentina. The tobacco industry has not prospered in the past partly because it is a crop requiring intensive methods and much hand labor, lack of uniform types, rather heavy local taxes, and high freight rates. In 1923 the National Department of Agriculture employed a tobacco specialist of many years' experience in Europe and Canada, under a five-year contract, to improve the quality of the types of tobacco grown and to encourage better methods of cultivation and handling. Considerable quantities of tobacco seed were distributed, and through the organization of the national and provincial departments of agriculture and the press, efforts were made to stimulate interest in this important crop. These efforts met with a favorable response, and it seems probable that the tobacco industry will expand and improve greatly in the next few years.

OTHER SPECIAL CROPS

In addition to the cereals, sugar cane, grapes, cotton, and tobacco, practically all other crops that can be grown in a temperate and subtropical climate are grown in Argentina, but unfortunately statistics of area and production are lacking.

Potatoes are important. The National Department of Agriculture reported the areas of production of potatoes in 1923–24, shown in Table 45:

TABLE 45.—*Potato area and production in Argentina in 1923–24*

Province	Area	Production
	Acres	*Metric tons*
Buenos Aires	321,989	716,980
Santa Fe	31,616	115,200
Mendoza	25,194	71,400
Other Provinces and Territories	23,218	56,400
Total	402,017	959,980

In the Province of Santa Fe two crops are planted, the first in August and September, which is harvested in November and December, and the second in February, which is harvested in May and June. The crop of 1923–24 was in excess of local consumption, and efforts were made to export some of the surplus to Brazil, but without much success. The average price for the crop was reported to be about 35 cents a bushel. Although potatoes are grown generally in small patches throughout the Republic, the commercial area, are concentrated in the Province of Buenos Aires, near the capital city, and near the sierras of Tandil, to the south, in the Province of Santa Fe near Rosario, and in Mendoza, where they are grown under irrigation. A new area under irrigation is developing in Santiago del Estero. It is not likely that the area and production of potatoes will increase until either population increases considerably or an export market can be found for surplus production.

Sweet potatoes, beans, chick-peas, peanuts, castor beans, rice, watermelons, cantaloupes, and citrus fruits are grown in the northern third of the country. Some broomcorn is grown in the northern part of the Province of Buenos Aires and in Santa Fe. Strawberries can be grown in many sections, but the season is short, and because of lack of proper methods and facilities for shipment they are consumed locally. Considerable quantities of oranges, tangerines, and lemons are produced, but there is much waste and loss in marketing these fruits through crude methods of handling. A small quantity of grapefruit is grown in the north, but as yet there is no market for it. Practically no blackberries, raspberries, currants, gooseberries, or nuts are grown in the country, although conditions seem very favorable in many localities. Peaches, pears, and quinces are grown from Buenos Aires north, especially in the delta of the Parana. Throughout a large portion of Argentina apples do not thrive, as the climate is generally too warm and the higher altitudes too dry. The best apples produced are those which come from the irrigated region along the Rio Negro. In the northern Provinces, especially Tucuman, Salta, and Jujuy, avocados (alligator pears) and other subtropical fruits are grown. In Misiones, northern Corrientes, Chaco, and Formosa bananas are grown in gardens.

A crop that is not known in the United States but that is of some importance in northern Argentina, especially in Misiones, Corrientes, Chaco, and Formosa, as well as in Paraguay and Brazil, is mandioca. Mandioca (*Manihot aipi* Mrt.) is a plant that grows from 5 to 8 feet high, with straight, columnar, reddish woody stalk, few or no branches, leaves like those of okra, and a number of fleshy roots 1½ to 3 inches in diameter and 12 to 30 inches long. It is propagated from pieces of the root planted closely together in rows 3 to 5 feet apart. The plant is very hardy and requires but little cultivation. It is harvested by pulling up the stalks with the roots attached. The yield is enormous. The roots are scraped and cooked in various ways. A small garden patch will produce enough food to support a family. In Brazil and Paraguay the roots are cleaned, scraped, dried, and ground into flour by machinery, the flour resembling potato flour in appearance.

Practically none of the grain sorghums, millets, or sugar beets are grown, although climatic and soil conditions are very favorable, because the millets and grain sorghums are not needed for feed and

there is no market for them. Sugar beets are not grown because of the hand labor required, the lack of beet-sugar mills, and the fact that the cane-sugar industry is already established with a capacity sufficient to meet the domestic demand.

A crop peculiar to a narrow stretch of country in northeastern Argentina east of the Parana River and extending northward through Paraguay and southeastern Brazil is yerba mate (*Ilex Paraguensis*) or Paraguayan tea. This is a small tree found growing wild. It prefers the red sandy clay soils which in Brazil have been found best adapted to coffee. The leaves have been used for making tea from time immemorial by the Indians, from whom the Spanish settlers adopted it. The leaves and small twigs are gathered and put through a primitve drying process over fire and then ground and put in bags. Since 1910 orchards of yerba mate have been planted and are proving profitable. When cultivated the trees resemble those in a young apple orchard. The yerba mate trees are said to be practically immune from insect pests and plant diseases, easy to propagate from seed, and make rapid growth under cultivation.

Another crop peculiar to Argentina is the tree crop in the cereal region. The Pampa is, of course, naturally treeless for distances of 500 miles or more. Throughout this region groves of trees, especially willows, cottonwoods, Lombardy poplars, eucalyptus, locusts, chinaberries, and conifers, have been planted for wind-breaks, shade, fuel, fence posts, lumber, poles, and crates. Many of the islands in the delta of the Parana that are extremely fertile but subject to inundations, are planted thickly with Lombardy poplars that are cut periodically for fuel and for crates and packing cases. Trees make rapid growth throughout the Pampa region and the tree crop is a profitable one. In Santa Fe the chinaberry tree (*Melia azedarach* L.) is preferred because it is practically immune from attacks of the locust. Apparently few nut trees have been planted, although soil and climate appear to be ideal for walnuts and pecans.

Natural conditions are favorable for all the miscellaneous crops mentioned in this section, but they are not grown on a more extensive scale because of lack of population, marketing facilities, and effective demand. A great increase in the production of cotton and a considerable increase in the production of tobacco may be expected, because there is a ready market for these products. A considerable increase in the production of citrus fruits and other miscellaneous crops referred to can take place whenever market conditions make an increase profitable.

Dry-Land Farming [11]

The system of dry-land farming that was developed in the United States in the last quarter of a century is beginning to be followed along the indefinite margins of the semiarid regions, and especially along the various lines of railway. The Western, the Pacific, and the Central Argentine Railways are particularly active in encouraging dry-land farming methods in order to increase the traffic over their lines. But aside from the narrow strip of territory along the railways which it is desirable to develop, it is a real economic waste

[11] Ferrocarril central Argentino. Nueva zona agrícola sobre la linea del F. C. C. A. en la Provincia de Santiago del Estero. Buenos Aires, 1924. Publicación n°. 36, junio de 1924.
Molins, W. J. Por tierras de secano. Buenos Aires, Establ. gráfico "Oceana," 1918.

to resort to dry-land farming in areas of deficient rainfall in a sparsely populated country, when there are enormous areas of fertile land with a temperate climate and ample rainfall within easy reach of the principal centers of population, and with good railway and port facilities.

Market, Vegetable, and Flower Gardens

Near Buenos Aires and other large cities considerable areas are devoted to market gardens in which all the common vegetables are grown. Because of the mild winter climate, many vegetables such as cabbages, beets, lettuce, and radishes are supplied throughout the winter. In all the cities and towns nearly every house has a vegetable garden and all have year-round flower gardens, except in the heart of the business sections. Most of the larger cities have ornamental parks and rose gardens; practically every city and town has a central park or plaza planted with trees, palms, and flower beds; and, with few exceptions, all the railway stations have small ornamental parks or plantings of palms, ornamental trees, roses, and other flowering plants.

Fertilizers

Commercial fertilizers and green manures are practically unknown in Argentina. Only in the market gardens near cities is any attempt made to use animal manure. No systematic rotation of crops is followed, although the same land may be used in different years for wheat, corn, or flaxseed. It is the general belief in the cereal region that the fertility of the soil is inexhaustible and that fertilizers will never be needed. In proof of this, it is alleged that corn or wheat has been grown continuously year after year on the same land for as many as 20 or 30 years without any decrease in yield.

Seed Time and Harvest [12]

The seasons in Argentina and other South American countries south of the Equator are just the reverse of those in the United States, and because of the milder climate in a large portion of the country the periods of seeding and harvesting are less definite and somewhat longer than in the cereal region in the United States. Table 46 is a schedule of average planting and harvesting dates in Argentina. It should be understood that as a general rule planting and harvesting begin in the north, progress southward, and end in the south.

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[12] Probably the best publication on practical farm and livestock management in Argentina is Alejandro Gandarias's Explotación practica de estancias y chacras. Buenos Aires, Libreria José Moly; also the following:

Argentine Republic. Ministerio de agriculture. Almanaque del Ministerio de Agricultura para el año 1925. Buenos Aires, Talleres gráficos del Ministerio de agricultura de la nación, 1924. Argentine Republic. Ministerio de agricultura de la nación. Propaganda e informes. Circ. 343.

TABLE 46.—*Seedtime and harvest months in Argentina*

Crop	Planting season		Harvesting season	
	Beginning	Ending	Beginning	Ending
Alfalfa (seed)	March	April	March	April.
Apples	October		January	May.
Apricots	September		January	March.
Asparagus	August	October	December	February.
Bananas	September	do	April	May.
Barley	April	September	November	December.
Beans, string	September	December	December	May.
Beans, dry	do	January	April	Do.
Beets	Throughout year		Throughout year.	
Broomcorn	September	November	March	April.
Cabbage	Throughout year		Throughout year.	
Cantaloupes	September	November	January	April.
Canary seed	do	December	December	January.
Castor beans	do	October	March	May.
Coffee	do	January	June	August.
Corn	do	December	March	April.
Cotton	do	November	February	Do.
Cherries	do		December	February.
Cucumbers	July	January	do	April.
Currants	September	October	do	January.
Eggplant	do	January	January	April.
Flaxseed	May	August	November	December.
Garlic	Throughout year		Throughout year.	
Grain sorghums	September	November	March	April.
Grapes (plants)	August	October	February	March.
Hemp	September	do	do	Do.
Hops (seed)	do	do	March	May.
Jute	do	November	do	
Lemons	Throughout year		Throughout year.	
Lettuce	do		Do.	
Mandarins	August	September	February	June.
Mandioca	September	October	January	May.
Oats	March	May	November	December.
Onions	February	October	Throughout year.	
Oranges	August	September	February	June.
Peaches	September		December	April.
Peanuts	October	November	March	May.
Pears	do		January	June.
Peppers	January	September	December	May.
Plums	September		January	March.
Potatoes	August	March	February	June.
Quinces	October		do	March
Radishes	Throughout year		Throughout year.	
Ramie (seed)	September	October	December	April.
Raspberries	October	November	January	March.
Rice	August	October	December	February.
Rye	March	May	November	December.
Squash	September	December	do	April.
Strawberries	April	August	July	September.
Sugar cane	November	December	April	June.
Sweet potatoes	August	September	March	May.
Tobacco	September		do	Do.
Tomatoes	July	February	November	June.
Turnips	Throughout year		Throughout year.	
Watermelons	September	November	January	April.
Wheat	May	July	November	December.
Yerba mate (plants)	February	April	May	September.

PRICE OF LAND

Owing to the fact that the land of Argentina originally cost nothing, that from the beginning it was taken up by individuals in large tracts and for several generations these large estates have passed by inheritance from parents to children, together with the fact that immigration has been small, transfers of land for a money consideration are relatively infrequent and there is much diversity of opinion as to its selling price. In general it may be said that when land sells or is advertised for sale in Argentina, the price is about one-third to one-half the price of land of the same quality and similar situation with reference to shipping stations, centers of population,

and markets, as in the United States. Good trucking land near cities, irrigated land planted to bearing vineyards in Mendoza and San Juan, and irrigated land planted to sugar cane or citrus fruits in Tucuman, Salta, or Jujuy is priced from $250 to $750 per acre; good alfalfa and grain land is priced from $40 to $100 per acre, depending on location and improvements; clear land suitable for cotton, tobacco, sugar cane, and citrus fruits in northern Argentina is priced from $10 to $100 per acre, according to improvements and proximity to shipping station or port.

Undeveloped land remote from transportation and shipping facilities, land covered with unmerchantable trees or bushes, land subject to inundations, swampy, or in a semiarid section without irrigation, and inaccessible land. either has no price or only a nominal price.

Public Land

Public lands of Argentina are situated in the Government Territories, especially in Misiones, Chaco, and Formosa, at a considerable distance from the cereal region and centers of population. Most of the desirable land along the rivers and railroads in this region has already been acquired by private owners and is generally held in large tracts. About 50 per cent of the public land has been surveyed and is open to settlement. The land law of the Republic provides that the public lands can be leased in limited areas by individuals for either agricultural or livestock production at an annual rental to be fixed by the National Department of Agriculture; also that the lands can be homesteaded, the requirements being that the settler shall reside on the land for a certain period, make certain improvements annually, and pay a certain price per acre to be fixed by the National Department of Agriculture.

Subdivision of Estates

Visitors from the United States and European countries are surprised to see almost on the outskirts of the capital city and other large cities and towns immense areas of virgin land untouched by the plow and utilized only for grazing purposes. These vacant spaces belong to the large estates, the owners of which do not care to subdivide or sell their holdings, partly because the average income derived from livestock on the rich pastures is ample, partly because they know that the land is steadily increasing in value, and partly from a feeling of family pride.

This is a serious problem in Argentina because unless it is made easy for immigrants from Europe to satisfy their land hunger and their desire to become independent proprietors, the overgrown cities will continue to increase in size, the vacant spaces in the country will remain uncultivated and relatively unproductive, and further immigration will be discouraged.

For more than half a century the statesmen of Argentina have discussed the wisdom of devising some way of limiting the size of estates or splitting up the larger holdings in order that some of the land might be subdivided, colonized, and brought under cultivation. So far, however, no decisive action has been taken, probably because of the unwillingness of proprietors to take the initiative in subdividing

their own estates or in approving laws that would limit the size of estates or make subdivision of them compulsory. In the fall of 1924, the minister of agriculture, foreseeing a probable influx of immigrants and the necessity of making land accessible to them on easy terms, proposed a law designed to authorize the National Government to expropriate up to 50 per cent of large holdings, with provision for fair compensation, in all cases where the proprietors are unwilling either to sell or to colonize at least 50 per cent of their land.

MANUFACTURING INDUSTRIES

The development of manufacturing industries in Argentina is handicapped by lack of water power; scarcity and cost of fuel and such raw materials as iron, steel, other metals, wood, and cotton, high freight rates, and relatively small population and low purchasing power. The country has great mineral resources, including coal and iron, but these are undeveloped. Petroleum wells at Rivadavia and in Neuquen are producing, but not in sufficient quantity to supply domestic needs. It therefore seems probable that until the domestic production of petroleum, coal, other minerals, and cotton is greatly augmented, the industrial development of Argentina will be retarded.

Unfortunately, the latest data with respect to the manufacturing industries of Argentina are those reported by the 1914 census (Table 47). The census reports show the value but not the quantity of production. The manufacturing industries of Argentina, as in some other South American countries, were stimulated during the war period by the reduced volume of imports available and by high prices. The census figures of 1914 are therefore of value simply as an indication of the status of the industry prior to the war.

TABLE 47.—*Principal Argentine manufacturing industries, 1914*

Industry	Establishments	Capital	Production	Value of raw material	Power	Persons engaged
	Number	*Dollars*	*Dollars*	*Dollars*	*Horsepower*	*Number*
Food	18,983	324,230,639	420,466,128	279,511,030	164,786	134,842
Clothing and toilet	7,081	42,526,921	68,060,323	38,079,076	5,784	57,764
Construction	8,582	91,771,964	97,483,146	41,406,671	44,570	87,317
Furniture and vehicles	4,441	26,590,793	36,957,139	17,593,563	9,026	29,007
Artistic and ornamental	996	6,175,090	6,843,485	2,990,684	442	4,297
Metals	3,275	45,685,996	40,029,681	19,437,864	17,935	29,327
Chemical	567	16,136,825	23,901,201	11,956,941	4,915	9,986
Graphic arts	1,439	14,001,389	16,837,171	5,698,078	3,058	13,286
Textile	2,458	14,616,860	17,084,978	9,551,046	10,203	15,560
Miscellaneous	957	177,151,440	62,688,821	35,126,031	418,038	28,815
Total	48,779	758,887,917	790,352,073	461,350,984	678,757	410,201

Values converted from paper pesos to dollars; 1 paper peso=$0.424512.

Since the census year there has been considerable development in the manufacturing industries, especially in the making of shoes and other leather goods, stockings and other fabrics, brick and cement, foundry work, tools, agricultural implements, coaches and rolling stock for railways, cigarettes and cigars, etc.

Mills, Elevators, and Warehouses

Argentina is well provided with flour mills and exports some flour. Most of these mills have modern equipment not only for grinding wheat into flour, but for making various forms of macaroni, vermicelli,

Fig. 14.—Hauling the sacks of wheat dropped by the combined header and thresher from the field. Southern Cordoba, Argentina, January, 1924

and spaghetti, of which large quantities are consumed. The greatest number of mills is to be found in Buenos Aires and Rosario, but branch mills are established at strategic points in the interior.

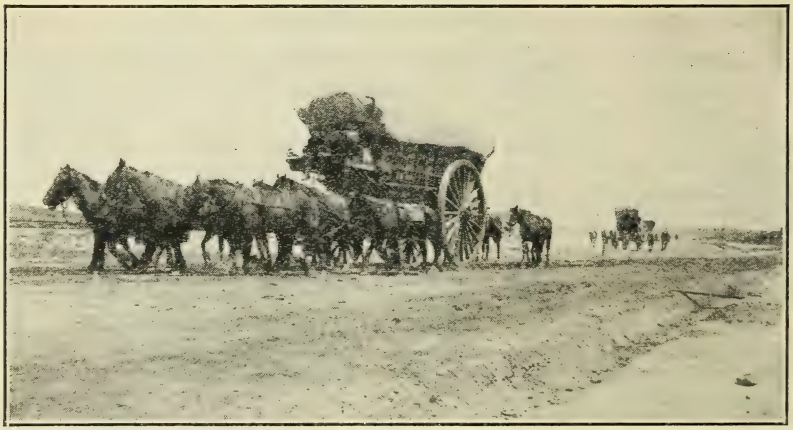

Fig. 15.—Freighters hauling wheat to the shipping station near Necochea, Province of Buenos Aires, 1924. These wagons carry from 12 to 20 tons

There are a few elevators along the docks at Buenos Aires, Rosario, and Bahia Blanca for handling grain at the mills and transshipping from cars for export. Aside from these, there are no elevators in Argentina, all grain in the interior and a large portion of the grain

at the ports being handled in jute sacks. On the farm the grain is sacked directly from the field or thresher (fig. 14), hauled in sacks to the shipping station (fig. 15), the sacks are piled in the sheet-iron warehouses at the railway stations to the limit of their capacity, and the surplus is then stacked outside; the sacked grain is hauled on flat cars under cover of tarpaulins (fig. 16), to the warehouses at the ports, again stacked in the warehouses in sacks, and most of it is loaded in ships while still in sacks.

This method of handling grain involves great expense annually for bags, much manual labor, and loss of time. There has been much discussion concerning the relative merits of handling grain through elevators and the present method of handling it in bags, but so far no individual or company has felt justified in undertaking to erect lines of country elevators. One of the principal arguments heard against the building of elevators is that cereal production is not yet stabilized in Argentina and that grain production in particular locali-

FIG. 16.—Wheat in sacks awaiting shipment at a railway station in Argentina

ties fluctuates so greatly from year to year that an elevator needed one year might not be needed another year.

The warehousing facilities at shipping points are inadequate in years of abundant production, although an Argentine statute requires that the railway companies shall provide adequate warehouses at all their shipping stations. In a year of heavy production it is not uncommon to see all the warehouses at shipping stations full and half as much more in sacks piled high outside, sometimes without the protection of large tarpaulins.

TRANSPORTATION

Rivers and Railways

Prior to 1857 when the first section of railway was constructed, the only means of transportation in Argentina was by wagon and horseback in the interior and by water on the Plata and Uruguay

Rivers and their tributaries. The waterways are still used. The following shows the increase in railway mileage since 1857:

	Miles		Miles
1857	6	1897	9, 338
1867	356	1907	13, 748
1877	1, 386	1917	21, 149
1887	4, 156	1924	22, 369

Country Roads

Throughout the cereal region and near the railroads in other regions, the country is generally under wire fence. Between the estates ample space has been left for roads, usually about 100 feet in width. Throughout most of the country little has been done to these open spaces left for roads, although in many counties, especially near important towns, dirt roads have been graded to the center with ditches at the sides for drainage. In a few sections, especially

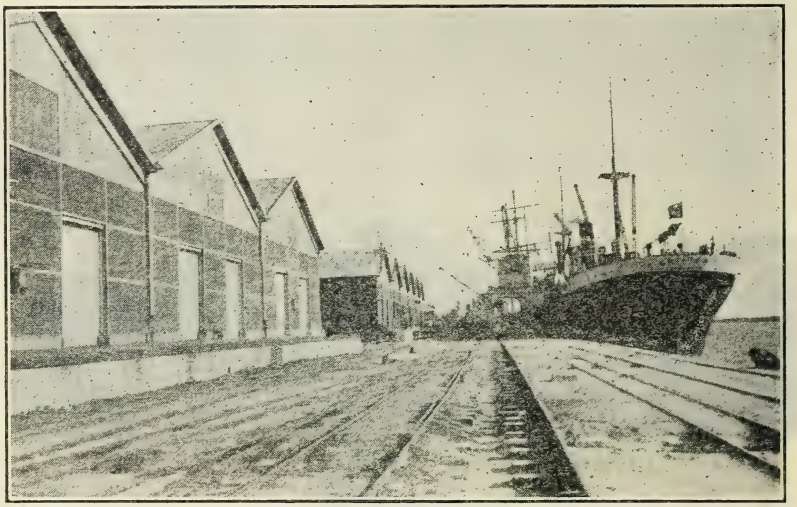

Fig. 17.—Warehouses and ocean-going ships at the Port of Rosario on the Parana River about 250 miles north of Buenos Aires, 1923

in the Provinces of Santa Fe, Cordoba, Tucuman, Mendoza, and San Juan, some well-constructed hard-surface roads have been provided. The dirt roads and flat spaces untouched by the plow or scraper between wire fences are fairly good in dry weather, but following a period of rain they become almost impassable.

Ports

Argentina is well provided with ports within easy access of its principal areas of agricultural and livestock production and they are equipped with modern facilities for storing commodities and for loading and unloading ships. (See fig. 17.) The most important ports are Buenos Aires, Rosario, Bahia Blanca, and La Plata. Of lesser importance are Zarate y Las Palmas, Santa Fe, Campana, San Nicolas, Villa Constitucion, Caba del Uruguay, and Diamante. The tonnage exported from these ports is shown in Table 48 for the years 1918 to 1923, inclusive.

TABLE 48.—*Principal ports of Argentina and export tonnage, 1918–1923*

[Thousands of short tons—000 omitted]

Port	Product [1]	1918	1919	1920	1921	1922	1923
Buenos Aires	ALF	3,269	4,245	3,605	3,094	3,842	3,958
Rosario	A	1,316	2,396	3,951	2,691	3,516	3,490
Bahia Blanca	A	734	940	1,831	977	874	1,801
Santa Fe	AF	100	110	272	177	446	563
La Plata	AL	718	908	950	529	468	511
San Nicolas	A	85	169	470	312	466	451
Villa Constitucion	A	22	117	259	259	354	356
Zarate y Las Palmas	L	192	212	168	105	110	119
Diamante	A	10	12	53	21	83	100
Concepcion del Uruguay	A	53	39	63	66	84	53
Campana	L	111	105	93	29	32	50

[1] A=Agricultural products. L=Livestock products. F=Forest products.

Approximate figures based on data published by the National Bureau of Statistics and the National Department of Agriculture. Figures converted from metric to short tons; 1 metric ton=2,204.6 pounds.

EXPORTS AND IMPORTS

As may be expected in a country essentially agricultural, more than 95 per cent of exports from Argentina consist of agricultural and livestock products, as shown by Table 49 (values being converted from gold pesos to dollars at the par rate of 96½ cents per peso).

TABLE 49.—*Value of exports, 1922 and 1923*

Groups of products	Value in—		Percentage of total		Increase 1923 over 1922	
	1922	1923	1922	1923	Value	Percentage
	Dollars	*Dollars*	*Per cent*	*Per cent*	*Dollars*	*Per cent*
Agriculture	396,128,798	399,217,932	60.7	53.6	3,089,134	0.8
Livestock	228,889,497	312,368,439	35.1	42.0	83,478,942	36.5
Forest	15,775,665	17,158,859	2.4	2.3	1,383,194	8.8
Other	11,554,438	15,618,388	1.8	2.1	4,063,950	35.2
Total	652,348,398	744,363,618	100.0	100.0	92,015,220	14.1

TABLE 50.—*Value of imports and exports and amounts free and subject to duty*

Item	1922	1923	Increase 1923 over 1922	
			Value	Percentage
	Dollars	*Dollars*	*Dollars*	*Per cent*
Imports:				
Subject to duty	488,482,784	652,309,716	163,826,932	33.5
Free	177,025,096	185,725,326	8,700,230	4.9
Total	665,507,880	838,035,042	172,527,162	25.9
Exports:				
Subject to duty	449,375,258	519,231,403	69,856,145	15.5
Free	202,972,751	215,482,215	12,509,464	6.2
Total	652,348,009	734,713,618	82,365,609	12.6
Excess of imports over exports	13,159,871	103,321,424	90,161,553	685.1

The imports include raw materials and manufactured articles, electrical appliances, textiles, alcoholic liquors, leather goods, lumber, furniture, machinery, breeding animals, edible oils, dried and pre-

served fish, malt, beans, rice, cheese, eggs, fresh fruit, yerba mate (73,500 tons), sugar, peanuts, tobacco, jute bags, lubricating oils, kerosene, gasoline, chemicals, paints, varnishes, paper, wire, sheet metal, automobiles, trucks, tractors, motors, machinery of all kinds, building materials, wine, and locomotives and other railway equipment.

The agricultural products exported in 1923, include those listed in Table 51:

TABLE 51.—*Argentina: Total exports of specified agricultural products, 1923* [1]

Product	Unit	Quantity	Product	Unit	Quantity
Animals:			Unclassified—Continued.		
Horses	Number	1,790	Frozen tongue	Pound	265
Asses	Number	6,423	Preserved tongue	Pound	1,999,784
Mules	Number	5,921	Other classified	Pound	61,664,867
Cattle	Number	95,691			
Sheep	Number	17,887	Total unclassified	Pound	286,683,692
Goats	Number	959			
Hogs	Number	13	Total all meats	Pound	1,961,053,428
Beef:			Grains:		
Chilled and frozen	Pound	1,195,340,734	Barley	Bushel	2,858,310
Dried, including salted meats.	Pound	1,202,433	Corn	Bushel	112,561,167
			Corn meal	Bushel	12,059
Grease and tallow	Pound	278,963,470	Oats	Bushel	31,584,546
Oleomargarine and palmetine.	Pound	1,906,869	Rye	Bushel	2,757,679
			Wheat	Bushel	136,753,431
Stearine	Pound	2,914,536	Wheat flour	Barrel	923,300
Jerked beef	Pound	10,416,325	Rice	Pound	239,199
Total beef	Pound	1,490,744,367	Other products:		
			Butter	Pound	72,337,335
			Cheese	Pound	12,684,865
Mutton: Chilled and frozen.	Pound	178,784,242	Sugar	Pound	2,877
			Wool	Pound	303,691,534
Pork:			Oil cake and oil-cake meal.	Pound	80,485,537
Frozen	Pound	4,019,808			
Preserved	Pound	723,695	Peanuts	Pound	12,372,096
Lard	Pound	18,854	Potatoes	Pound	1,178,836
Bacon	Pound	11,442	Tobacco	Pound	516,705
Hams	Pound	67,328	Hides and skins	Pound	388,319,183
			Flaxseed	Bushel	40,776,754
Total pork	Pound	4,841,127	Linseed oil	Pound	1,144,240
			Quebracho extract	Pound	366,977,716
Unclassified:			Grape juice	Pound	485,382
Preserved	Pound	176,639,166	Argentine wines	Gallon	437,649
Extracts	Pound	3,422,015	Wine sediments	Pound	8,061,885
Ground meats	Pound	24,060,244	Beer	Pound	62,582
Sausage casings	Pound	18,897,351			

[1] Compiled from Argentine Republic. Direccion general de estadística de la nacion. El comercio exterior Argentino en 1923 y 1922. Buenos Aires, Guillermo Kraft, impresor, 1924. Boletin 191.

ECONOMIC FACTORS

LABOR

SUPPLY

Few complaints are heard of scarcity of farm labor. Farm labor consists principally of native peons, Italian and Russian peasants, and Indians. The Indians are employed during the harvest season in the sugar-cane fields of Tucuman and the cotton fields of the Chaco country, and at other times in the quebracho and yerba maté establishments. In the cereal region farming is organized to utilize extensive methods—modern machinery such as gang plows and combined harvesters and threshers—so that the number of men required in proportion to the area cultivated is relatively small and economical. It seems probable that any material increase in the

area or production of grain or other cultivated crops will require an additional supply of labor through immigration. The annual migration of laborers from southern Europe for the harvest period which was important a few years ago seems to have dwindled. In the larger cities labor is well organized but in the country it is wholly unorganized.

Wages of Farm Labor

Generally speaking, the wages of farm labor in Argentina are low. A minimum-wage law was passed which in actual practice either is not observed or the minimum wage prescribed is regarded as a maximum. The minimum for unskilled farm labor is 3 to 3½ pesos per day without board, which at the rate of exchange prevailing in 1924 was equivalent to about $1. A considerable portion of this minimum wage is accounted for by shelter, fuel, use of a horse, a garden, and other privileges and allowances, so that the cash wages are often very low.

FARM HOUSES AND BUILDINGS

Three general types of houses are to be seen on the farms and ranches of Argentina:

(1) Those of proprietors of the larger estates, (2) those of proprietors of the smaller ranches and farms and of tenants, and (3) those of the peons and farm laborers.

The country houses of the best class on the larger estates are usually large, often palatial, always well and sometimes luxuriously furnished. Usually there is a separate dwelling for the manager, another for the cook and house servants, a separate kitchen, usually at some distance, an administrative-office building, a storeroom for grocery and other supplies, and separate quarters, kitchen, dining hall, and storeroom for the force of peons and laborers. A short distance away are the barns, usually frame, covered with sheet iron, for storing grain and farm machinery, or for housing the prize-breeding animals. The group of buildings, almost a small village in size, is surrounded by groves of tall trees, a flower garden, vegetable garden, a small orchard, and often extensive polo grounds. At some distance from the main group are usually one or more dwellings and grounds occupied by the various overseers. Usually a broad avenue lined with tall Lombardy poplars, willows, eucalyptus, or chinaberry trees leads from the principal entrance to the main group of buildings, often a mile or more in length. Rarely can any of the buildings be seen from the public road or railway because of the surrounding trees.

Houses of the second class, occupied by small proprietors and tenants, are built on the same plan but are much smaller in size. The general plan is to build three rooms in a row east and west, with an L one room deep at each end on the south and cover the entire structure with a metal roof, often held in place with poles, pieces of concrete, or even earth. The floor may be of tile, brick, wood, or earth, and the walls may or may not be smoothed with cement, painted or unpainted. Near the central veranda or at either end of the building is the well and an oval outdoor oven made of brick, cement, or adobe in which the family baking is done. The better houses of this class have trees around them, the poorer none, but all have flowers. Most of them have a barn or shed for grain and machinery.

Instead of corn cribs, "trojes" are erected (fig. 18). These are made by setting up four or more poles in a square or circle and surrounding them with woven wire fencing or wire fencing interwoven with cornstalks, bamboo, or brush. They are without roof or cover and the husked corn is carried in sacks up a ladder and emptied into the inclosure.

There is more diversity in the houses of peons and laborers than in those of proprietors and tenants. On the large ranches and sugar estates where from 10 to 300 or more laborers are employed, single rooms are built of brick or adobe in solid rows, sometimes with, but often without, floors, windows, fireplaces, or verandas in front. Isolated houses of this character in the cereal region may have one, two, or more rooms end to end, but rarely more than three. Most of them have the outdoor mud or brick oven. Few of them have any other shelter or structure than the rooms occupied by the laborer

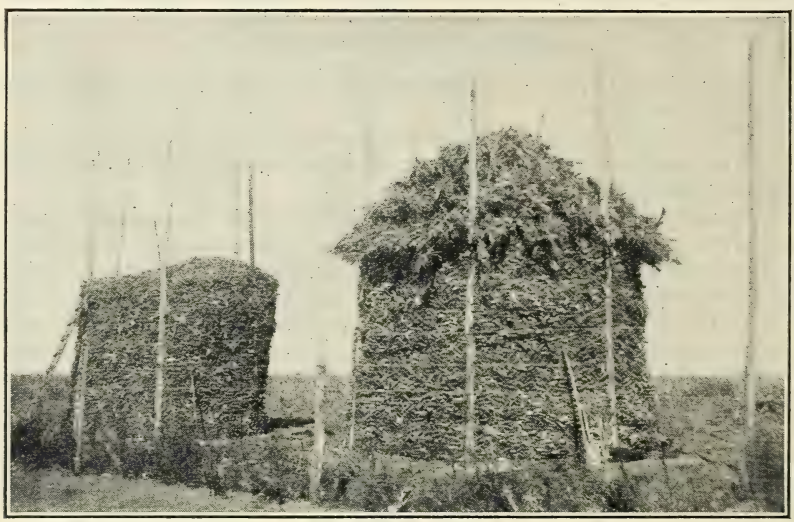

FIG. 18.—"Trojes," native corn cribs constructed of poles and wire fencing. Southwestern Buenos Aires, Argentina, May, 1924

and his family. In the subtropical region of the north the structures occupied by the peons and Indians are even more primitive. Most of them are adobe huts, or huts made of poles or bamboo partially chinked with mud. Many are made of a few poles set in the ground with some brush piled on top and on three sides, which furnish shade in summer but little or no protection against rain or the cold pamperos of winter.

TAXES

From the beginning the national and provincial legislatures have been composed almost exclusively of landowners and livestock producers who have naturally seen to it that the public revenues should be raised by tariffs on imports, imposts on exports, and licenses to buy, sell, or transport commodities, thus leaving the land and livestock practically exempt from taxation. The owner of livestock pays no taxes until he attempts to move them out of the local jurisdiction, which he can not do without a permit, for which he pays so

much per head. Imported articles, such as cigarettes and cigars, for example, are often subject to the payment of three duties, one each to the national, provincial, and municipal governments.

COST OF PRODUCTION OF CROPS

Some data on cost of production of principal crops have been collected by the National Department of Agriculture and by the Rural Society of Argentina, but these are based largely upon individual estimates rather than a systematic study. The bureau of statistics and rural economy has prepared a circular and blank forms for keeping records and computing costs, and in the course of time these records will supply fairly accurate data. Many of the large country estates employ accountants to keep systematic records but they are not uniform and important items are often omitted.

Compared with farmers in the United States, the Argentine producers have the advantage of cheaper land, cheaper labor, cheaper power, and a relatively short haul to the seaboard. The land is held in large tracts, which permit the economical use of large machines. The land is uniformly fertile and no artificial fertilizers are necessary. The standard of living of the farm laborers is low and wages are considerably below farm wages in the United States. There is an ample supply of horses that require no feed other than pasture and that receive no shelter and very little care. The distance from the seaboard is not over 150 miles on the average. Because of the short land haul, the combined freight rates from the grainfields of Argentina to Europe are probably less than from the grainfields west of the Mississippi River. Ocean freight rates on grain from Argentine ports to western Europe are but little higher than from the Atlantic ports of the United States. The distance by water from Buenos Aires to New York is about the same as from the Pacific coast cities by way of the Panama Canal.

It seems probable that the present system of farm and ranch management in Argentina is more efficient and economical so far as concerns cost of production per man or per unit of product than a tenant system of farming or greater subdivision of land among small owners, because of the large areas, the organized force of employees controlled systematically by a single management, the use of large modern machinery, and economies which result from a semifactory organization. It is a system highly economical in use of men, but prodigal in the use of land and is therefore well adapted to the present situation of a superabundance of land and scarcity of population.

CHAMBERS OF COMMERCE AND BOARDS OF TRADE

Chambers of commerce and boards of trade have been organized in the principal cities, especially Buenos Aires, Rosario, Santa Fe, and Bahia Blanca. The most important grain exchanges are the Mercado de Cereales a Termino de Buenos Aires and the Bolsa de Cereales at Rosario, Santa Fe, and Bahia Blanca. A livestock exchange was organized in Buenos Aires in 1924. The Mercado Central de Frutos de Avellaneda at Buenos Aires is the principal exchange or market for hides and wool. No exchanges have yet been organized for cotton, tobacco or fruits.

PRINCIPAL GRAIN EXPORTERS

The export trade in grain is largely in the hands of two firms which handle more than 60 per cent of the total grain exported annually from Argentina. Each of these firms has a large buying organization, equipment at the principal ports, and is in constant communication with the consuming markets of Europe. They are reported to advance considerable sums of money to producers and country factors to finance the harvesting of the crop and to be in a position to obtain special service from the railways. To what extent the two firms compete with each other or act in concert in dividing up the territory and determining country prices is not known.

COOPERATION

Agricultural cooperative societies have multiplied throughout the cereal region and in the wine-grape region of Mendoza and San Juan. In 1913 there were 34 societies with a membership of 13,371. These increased in 1919 to 82 societies with 20,211 members and a capital of about $2,967,344 and business amounting to about $5,325,000 per annum, and hail insurance amounting to more than $100,000,000. The number of societies has since more than doubled. These societies are formed mainly by groups of farmers and usually they have a cooperative store and warehouse through which they buy farm machinery, fencing material, seed, clothing, and supplies, insure their crops, and sell their grain.

The membership of the cooperative societies is largely Italian. Their organization has proved to be one of the most effective means of promoting community effort among farmers for public improvements, for concentrating their buying power and financial resources, for mutual crop insurance, for obtaining a measure of independence from certain monopolistic tendencies and for dealing directly with buying and selling agencies at the terminal markets, transportation companies, and public authorities. Perhaps the finest thing about these cooperative societies in Argentina is the spirit of enterprise, initiative, pride, self-help, and public spirit that is developed in the membership. This is a factor of the utmost importance in a country whose people are accustomed to depend almost entirely upon a slow-moving government to take the initiative in all public improvements and the correction of all abuses, local as well as national.

BANKS AND CREDIT FACILITIES

Argentina has ample banking and credit facilities, including national and provincial Argentine banks, as well as British, German, Italian, French, and Spanish banks in the larger cities, and in Buenos Aires two United States banks. Perhaps the two most important banks in the Republic are the National Bank (Banco de la Nacion) and the National Mortgage Bank (Banco Hypotecario de la Nacion). Both of these banks have branches in every important town and both finance farm and livestock operations. On December 31, 1924, the National Bank had deposits amounting to $584,000,000. The total bank deposits on that date amounted to $1,130,000,000. The total money in circulation in 1924 is reported as $513,000,000 (1,319,797,739 pesos), with a gold reserve of $399,000,000 (451,782,984 pesos), which is a gold guarantee of 77.8 per cent.

FUTURE OF ARGENTINA

It is always hazardous to attempt to forecast the future development of a country and a people, especially of a country of sparse population and great undeveloped natural resources, in an age of epoch-making inventions and scientific discoveries, rapid communication, mobile capital, and shifting populations of different nationalities. Argentina has a cereal region as fertile and as large as the Corn Belt region of the United States, but only about 16.2 per cent of this region is in cultivation. Except for limited areas that are too wet for cultivated crops, the whole region is ideal for crop production and can be brought under cultivation merely by breaking the sod, with no unproductive land except that used for roads and necessary buildings. The wet areas can easily and profitably be drained whenever economic conditions justify.

Since the potential cereal area is now used as alfalfa pasture land, livestock production will probably decrease in quantity with the expansion of agriculture. On the other hand, the quality of livestock may improve and dairy production may be expected to increase greatly in quantity, quality, and value.

Natural conditions are favorable to the development of a prosperous cotton and tobacco industry in northeastern Argentina. The future of the sugar-cane industry will depend almost entirely upon increase in population and the domestic demand. Highly specialized crops such as wine grapes, fruits, and alfalfa under irrigation in the north and west may be expected to increase whenever freight rates are reduced and market conditions are favorable. The production of high-quality apples and pears in the Rio Negro country to the south should develop into a profitable industry. The production of oil seeds, such as cottonseed, peanuts, soy beans, and castor beans, in addition to linseed, may be expected to increase greatly with increase in population and facilities for crushing the seed.

Land is abundant, fertile, easily brought under cultivation, and prices are about one-third to one-half those in the United States. For present-crop areas and production the supply of labor is ample and wages are low. The average size of farms in the cereal region is large, modern machinery is used, and the management and control of labor, equipment, and farm operations is economical, so that the average production is large per man and per farm organization, but is small per unit of land. Cost of production of crops, livestock, and livestock products is low, and distances to ports are relatively short. Rail and water transportation facilities are good, but country roads and schools are poor.

The forest resources in the north of Argentina are being rapidly depleted, but in the Pampa region considerable areas in the aggregate have been planted to trees that are flourishing. The mineral resources of the country are almost wholly undeveloped. Manufacturing industries are increasing steadily, but their expansion is limited by lack of fuel, waterpower, and certain raw materials, especially metals, woods, fibers, and chemicals.

To an observer from the United States much of Argentina at the present time suggests conditions in the newly settled portions of Texas, Oklahoma, Kansas, and Nebraska, 25 or 30 years ago, except that the smaller towns usually have an ornamental park, electric

lights, motion pictures, automobiles, telephones, radio outfits, and other modern conveniences unknown in those days. There are the same great expanses of virgin prairie, herds of fat cattle and horses, interminable wire fences, absence of graded roads, and great distances between houses, schools, and small towns. The many small towns have wide, unpaved streets that are heavy with dust in dry weather and are seas of mud in wet weather. Although surrounded by fertile regions, they are quiet, sleepy, and unprogressive largely because of the sparse population and lack of purchasing power.

Obviously, the agricultural and economical development of Argentina waits on population and change of organization from a land of large estates with absentee landlords to a system of smaller holdings by families that make their living on the land and contribute by their labor and purchasing power to the development of the country and to the national welfare and prosperity.

SOURCES OF INFORMATION RELATING TO ARGENTINA

The Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C. Furnishes agricultural and livestock statistics, crop reports, export and import statistics, and data relating to economic factors of production.

The Bureau of Foreign and Domestic Commerce, United States Department of Commerce, Washington, D. C. Furnishes statistics and information relating to manufactures, transportation, trade regulations and opportunities, commerce, and economic factors of business.

The Consular Service, United States Department of State, Washington, D. C. Furnishes information relating to passports, immigration laws and regulations, tariffs, and commerce.

The Pan-American Union, Washington, D. C. Has a trade commissioner, a library of publications relating to Argentina, is in constant communication with the Argentine embassy, and publishes statistical, descriptive, and news data periodically.

The American consul at Buenos Aires can supply the latest information regarding laws and regulations relating to imports and exports, tariffs, licenses, travel, immigration, and business situations.

The commercial attaché of the American embassy at Buenos Aires can supply the latest information relating to particular branches of trade and industry or to business situations and opportunities in particular cities or sections.

Both the American consul and the commercial attaché are in the best situation to obtain specific information from or relating to any particular business firm, institution, or branch of the Argentine Federal Government.

The International Institute of Agriculture at Rome cables and publishes crop and livestock reports and statistics periodically.

PARAGUAY[13]

Paraguay is a small country, relatively speaking, off the main line of tourist travel, and although its capital city was founded in 1537, it is but little known in the United States except as a place on the map, the principal source of yerba maté or Paraguayan tea, a country which supported the celebrated dictator, Francia, and lost most of its adult male population in the destructive war with the combined forces of Argentina, Uruguay, and Brazil in 1865–1872. Paraguay is a most attractive and interesting country of primitive customs and great undeveloped natural resources. Because of these facts and the further fact that it has approximately 50,000,000 acres of fertile land well adapted to agriculture and livestock, it is

[13] With the collaboration of G. B. L. Arner, agricultural statistician.

believed that these notes, based on two weeks' observation of a trained agriculturalist who was particularly interested in its present and potential agricultural production and resources, will be of interest to American farmers, business men, and student of economic geography. The observations were made in August (midwinter) of 1924.

GEOGRAPHY AND CLIMATE

LOCATION AND AREA [14]

Paraguay is situated a little south of a line drawn directly west from Rio de Janeiro and a little east of a line drawn midway between the Atlantic and Pacific Oceans. The Tropic of Capricorn (23° 30′

FIG 19.—Paraguay lies directly south of Newfoundland and is about the same latitude south of the equator as central Mexico and Cuba are north of it

south of the Equator) crosses northern Paraguay, so that about one-fifth of the country lies in the Tropics and four-fifths in the temperate zone. Most of Paraguay lies between the parallels of longitude 55° and 60° west of Greenwich. It is therefore directly south of Newfoundland and is about the same latitude south of the Equator as central Mexico and Cuba are north of the Equator.

Paraguay proper lies between the Paraguay and Alto Parana Rivers and is estimated at 61,647 square miles. The area known as the Chaco on the west of the Paraguay River is officially reported to be 100,000 square miles. This region has been claimed by Paraguay but her rights are disputed by Bolivia.

[14] Gásperi, Luis de. Geografía del Paraguay. . . . 1. ed. Buenos Aires. Talleres "Casa Jacobo Peuser." 1920.

TOPOGRAPHY [15]

The country east of the Paraguay River is altogether different from the territory west of the river. East of the river the surface is undulating, hilly, mountainous, and well watered with many small rivers and mountain brooks, well wooded with magnificent forests interspersed with beautiful open prairies, and there are some swamp areas along the lower courses of the rivers. It is a beautiful country, much like the Piedmont section of the Carolinas and Georgia. West of the river the country is flat until the foothills of the mountains of Bolivia to the west are reached—a country of swamps, alternating strips of spiny woods, palms, and prairies becoming drier and semi-arid in the west.

MOUNTAINS

East of the river there are innumerable sierras or ranges of low mountains and isolated peaks well distributed over the country and generally extending in a northeast-southwest direction. They are usually low and heavily wooded to their summits with magnificient trees of fine hardwoods suitable for cabinet-making and construction work. The principal mountain range is the Sierra Amanbay, which crosses the country from north to south, and the Mbarcayu, a continuation of the former, running in an east-and-west direction. The height of these mountains is not given, but probably none of them exceed 2,200 feet.

LAKES

There are many lagoons and lakes, the principal of which are Lake Ypoa and Lake Ypacara. Lake Ypoa is about 35 miles south of Asunción and 25 miles east of the Paraguay River. This is about 25 miles long by 8 miles wide. Lake Ypacara is situated about 20 miles east of Asunción and is approximately 18 miles long by 6 miles wide. There are beautiful sierras to the east and the small town of San Bernardino serves as a winter resort. Many lagoons and swamps of large extent are found in the interior and along the water courses, which are grown up with swamp grass, cat-tails, reeds, and other aquatic plants.

RIVERS

Paraguay has two large and many small rivers. The Alta Parana on the east and south rises in the mountains of southeastern Brazil and flows generally in a southwest direction to its junction with the Paraguay, a short distance from Corrientes, which then flows almost due south to the La Plata. The Parana is over 2,000 miles long and above its junction with the Paraguay it is called the Alta (Upper) Parana. Along the border of Paraguay for nearly 700 miles it is a broad stream, from one-half mile to 3 miles wide, of clear water with a swift current flowing over a rocky or sandy bottom, with numerous islands and high, well-wooded banks. It is navigable from the falls of Guayra to its junction with the Paraguay, a distance of 676 miles. About 100 miles south of the Guayra Falls is the mouth of the Iguazu and a few miles up this river are the great falls of the Iguazu, which are more than three times as high as Niagara.

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[15] Bertoni, M. S. Descripción física y económica del Paraguay; mapa del Paraguay Oriental, Llech-Augusto de 1915. Asunción.
Gásperi, F. E. Atlas general de la República del Paraguay . . . 1. ed. Buenos Aires, "Casa Jacobo Peuser." 1920.

The Paraguay River rises in the State of Matto Grosso, Brazil, and flows 1,800 miles south and southeast to its junction with the Parana. It is from one-half mile to several miles wide, full of islands and sand bars, water slightly colored, eastern bank generally high and western bank generally very flat, both well-wooded. It is navigable its entire length for vessels of small draft.

The River Pilcomayo forms a southwestern boundary between the Paraguayan and the Argentine Chaco for a distance of more than 300 miles, and is navigable for small boats.

There are many other smaller rivers, some of which are navigable for short distances by boats of light draft.

SOILS

In a country so diversified in its topography as Paraguay there are naturally many different types of soils. East of the river soils are generally light in color and a considerable proportion of them are deep red, like the red clays of the Piedmont section of Virginia, the Carolinas, Georgia, and Alabama. These soils are said to be best for yerba maté, coffee, sugar cane, tobacco, and cotton. There is also a large percentage of coarse, red, sandy-clay soils, especially near the rivers. In the valleys and low places the soil is dark and appears to have more humus. The soils appear to be derived largely from sandstone and granite. Apparently they are not so strong as the dark loam soils of the Argentine pampa, but the abundance of rain compensates in large measure for their deficiency. The soils of Paraguay are described as "fertile, rich in organic nitrogen and mineral, soluble phosphoric acid, potash, lime, iron, and magnesia. No other soil is comparable with it except the red soils of Brazil." [16] But in the southern part, from Encarnacion to Asunción, there is no evidence of lime.

NATIVE VEGETATION

Paraguay is covered almost throughout its extent with native vegetation, an alternation of forests and prairies. East of the river the hills and sierras are covered with a thick growth of heavy timber, magnificent trees of hardwood suitable for construction and cabinet work. On the lower levels are great palmeros, regions covered with a scattered growth of tall, graceful palms that are useful for their fruit, their leaves, and their wood. The palms make excellent telegraph and telephone poles and fence posts, as they are straight and durable. East of the river innumerable groves of yerba maté (*Ilex paraguayensis*) are found, perhaps the most valuable product of the country. There are vast numbers of wild orange trees which bear excellent fruit. At least a hundred varieties are found of trees useful for construction and cabinet work, such as lepacho, cedro, palo santo, guayabi, jacaramda, curupay, guayaba, amoreseco-guazu, tuyra-para, guaberay, laurel-morobi, espina corona, araticui, palo blanco, etc. There are innumerable spiny shrubs and bushes.

West of the river are alternating zones of forests, prairies, and marshes. The forests contain many species, but the most valuable are quebracho colorado, quebracho blanco, algorroba, cedro, various

[16] Gásperi, Luis de. Geografía del Paraguay . . . 1 ed. Buenos Aires, Talleres "Casa Jacobo Peuser," 1920.

acacias, and the palmeros, the last usually with grass growing underneath. In this region are innumerable spiny bushes, shrubs, and cacti. The prairie regions on both sides of the river are covered with pasto duro (bunch grass, pampas grass, etc.) that is good for pasture only during the early stages of its growth. Between the bunch grass are various species of finer grasses. The marshes are grown up solidly with reeds and aquatic plants, and are covered with thickets of spiny shrubs overgrown with vines. Generally the trees are covered with moss, lichens, and climbing vines, some of which are enormous, as well as many varieties of orchids and other air plants. Thickets of bamboo grow along the streams and rivers and even in the mountains, many of them 5 to 6 inches in diameter and 45 feet in height. Among the wild plants are cannas and several other varieties of liliaceous plants. The wild geranium is widely distributed, the flowers being scarlet, purple, or white. Clovers and medicagoes are not seen.

NATIVE ANIMALS

The animal life of Paraguay, like the vegetation, is rich in species and varieties. Azara,[17] a Spanish surveyor who explored the country at the close of the eighteenth century, describes more than 400 species of birds. The most common birds to be seen at the present time are vultures, hawks, parrots, parrakeets, and waterfowl, including ducks, herons, and swans. The parrot tribe is probably most numerous, said to be so numerous that the small grains can not be grown successfully because the parrots come in great flocks and devour the grain as fast as it forms. Humming birds and partridges are plentiful. In a long day's ride through a wide and generally open country not a single owl, rabbit, dove, or meadow lark (pecho colorado), so common in Argentina, was seen.

The South American leopard (jaguar or tiger) is said to be rather common, as well as deer and wild hogs. Monkeys and the small armadillo (peludo or muleta) are plentiful in many regions. Reptiles are abundant, especially the jacarey or small alligator, which can be seen by the hundreds sunning themselves on the banks of the Paraguay and other rivers and lagoons. Among the snakes may be counted rattlesnakes and a species of boa 15 to 18 feet in length. Butterflies of brilliant color and giant moths are abundant. Flies, mosquitoes, and ants are great pests, as are the many other stinging and biting insects. Flies are everywhere, and certain writers speak of swarms of them so great as to appear like a column of smoke. Mosquitoes that are active, enterprising, voracious, and poisonous are present everywhere. Travelers in some of the regions require mosquito protectors over their faces and hands even in the daytime. Ants are universal and are a serious pest for all crop plants. In the open prairies, especially in the lower areas, they build nests of earth 3 or more feet in height, conically shaped, and hard as a brick. These groups of nests sometimes cover several square miles in extent and are spaced irregularly from 9 to 45 feet apart. Isolated nests

[17] Azara, Félix de. Viajes por la América meridional . . . Publicados con arreglo a los manuscritos del autor, con una noticia sobre su vida y sus escritos, por C. A. Walckenaer . . . Tr. del Francés por Francisco de las Barras de Aragón. (Madrid) Calpe, 1923. t. 1-2. (Viajes clasicos).

can be seen everywhere. Yerba maté is one of the few trees which the ants do not attack. It is said that the voracious locusts that constitute a national calamity in Argentina are not a serious pest in Paraguay.

GENERAL FEATURES OF THE CLIMATE

The upper fourth of Paraguay is in the Tropics and the lower three-fourths in the Temperate Zone. The climate is described as hot in summer but not unhealthful, being tempered by the mountains, rivers, and winds. It is subject to sudden changes in temperature depending on change in the direction of prevailing winds. When the wind blows steadily from the north for several days, the temperature is high and the atmosphere becomes saturated with moisture. When the "pamperos" (winds cooled by the icebergs south of Cape Horn) of the Argentine sweep up from the south there is a sudden fall in temperature, often accompanied by heavy rain. In winter (June to September) the temperature often remains but little above freezing for several days, and other days are hot like midsummer. The winters are mild, and orange trees, bougainvillea, roses, dahlias, poinsettias, nasturtiums, and other flowers continue in full bloom. As Paraguay is south of the Equator, the seasons are just the reverse of those in the Northern Hemisphere.

In the annual report for 1923 of the National Agricultural Bank, various sources of information regarding the climate of Paraguay are mentioned. Among them are included observations made at the meteorological stations of Paraguay, the data collected and published by the Meteorological Bureau of Argentina in the adjoining frontier regions, the series of continuous observations and studies extending through a period of 40 years since 1884, particularly with reference to agriculture, made by Moises S. Bertoni [18] in Alta Parana, the correlative series for a period of 10 years in the extinct national school of agriculture, now the Jardin Botanico, and the succeeding series carried on by the director of the botanical garden.

At present, four stations exist for taking meteorological observations, at Asuncion, Jardin Botanico (near Asunción), Puerto Bertoni, and Ypacarai. Rainfall observations are taken at 19 stations. The revolution of 1923 seriously interfered with the series of observations for that year, which are therefore incomplete.

Temperature [19]

The mean temperature of Paraguay is said to be about 81° F. in summer and 63° F. in winter. The year 1923 is fairly typical. For that year the classification of temperatures by months is given in Table 52. The hot season lasts from October to March and the cold season from April to September.

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[18] Bertoni, M. S. Estudio de las periodicidades diarias aparentes o reales de las lluvias y tempestades . . . Alto Paraná, Puerto Bertoni, Imprenta y edición "Ex Sylvis," 1918. (Descripción física y económica del Paraguay. Div. 2, Metéorología y climatología. Sección 24, Prognosia del tiempo, Núm 24: 2).

Bertoni, M. S. Memoria sobre la existencia de lluvias periodicas en determinados días del año un factor mas para la previsión del tiempo . . . Alto Paraná Puerto Bertoni. Imprenta y edición "Ex Sylvis," 1918.

[19] Banco agrícola del Paraguay, Asunción. Memoria . . . correspondiente al año 1923 . . . Asunción. La Colmena S. A., 1924.

TABLE 52.—*Temperature of Paraguay: Classification by months, 1923*

Classification	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Days	*Days*	*Days*	*Days*	*Days*	*Days*	*Days*	*Days*	*Days*	*Days*	*Days*	*Days*	*Days*
Equatorial (more than 77° F.)	28	27	28	17	2	5	4	11	12	14	19	25	192
Tropical (68° to 77° F.)	3	1	3	9	13	6	5	5	9	14	11	5	84
Temperate hot (59° to 68°)	0	0	0	4	9	14	9	8	7	3	0	1	55
Temperate (50° to 59° F.)	0	0	0	0	6	5	8	7	2	0	0	0	28
Cold (less than 50° F.)	0	0	0	0	1	0	5	0	0	0	0	0	6

The maximum absolute temperature observed was very moderate having reached only 105° F. at various points where it usually rises to 113° F. The minimum absolute temperature noted was about 0.5° F. above freezing. At Asunción, which does not vary widely from other stations, observations taken in 1923 are shown in Table 53:

TABLE 53.—*Range in temperature (Fahrenheit) by months and monthly average temperature of Asunción, 1923*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
Monthly average	83.1	83.7	84.2	79.7	64.9	68.2	63.3	70.7	72.9	75.9	78.6	84.2	75.8
Highest	87.8	90.0	90.7	85.6	80.8	79.2	74.1	84.4	85.8	85.1	88.3	93.2	85.4
Lowest	77.4	75.9	75.4	68.0	68.9	57.7	45.3	51.3	60.4	67.3	71.1	77.9	66.4

RAINFALL

The rainfall of the Republic is said to average 46 inches and is almost equally distributed. The heaviest rainfall occurs during August, September, and October. For 1923 the average total rainfall by agricultural regions was, north 48.3 inches, central 55.9 inches, south 62.2 inches, Guaira 63.9 inches, Cordillera 73.7 inches, Misiones 80.2 inches, Encarnacion 82.4 inches, and Paraguari 95.1 inches. The minimum is equal to about 48 inches and the maximum to about 104 inches. The monthly distribution of rainfall at Asunción in 1923 is reported in Table 54.

TABLE 54.—*Monthly distribution of rainfall and cloudiness at Asunción, 1923*

Month	Rainfall					Cloudy days		
	Days	Amount	Average per day	Maximum in one day	Average for each rain	Cloudy	Overclouded [1]	Average cloudiness
	Number	*Inches*	*Inches*	*Inches*	*Inches*	*Days*	*Days*	*Days*
January	7	3.9	0.1	1.7	0.6			
February	6	2.6	.1	1.1	.4			
March	6	2.8	.1	1.6	.5			
April	8	1.4	.047	.6	.2			
May	9	7.0	.2	2.3	.8			
June	13	2.1	.1	.8	.2			
July	4	1.3	.039	1.3	.3			
August	4	.2	.0	.2	.1			
September	9	1.3	.039	.9	.1			
October	11	13.1	.4	5.2	1.2	10	21	3.8
November	12	4.1	.1	1.2	.3	18	12	3.5
December	9	8.0	.3	2.4	.9	14	17	2.8
Total	98	47.8	.1	5.2	.5			

[1] Covered with clouds.

POPULATION AND POLITICAL SUBDIVISIONS

No complete census of the population of Paraguay has ever been taken. The total population is estimated at from 650,000 to 1,000,000, the latter figure probably being somewhere near the truth. In the war between Paraguay and the coalition formed by Brazil, Uruguay, and Argentina from 1865 to 1872, it is said that practically all the men over 10 years of age were exterminated, so that since then the women have greatly outnumbered the men and have had to take an active part in the manual labor of the country. As a result the women are erect, well developed, and industrious. Large families are the rule.

The population of Paraguay has as a base the original Guarani Indians, a fine aboriginal race, crossed with Spanish adventurers, with some additions during the last half century of Germans and Italians. The characteristics of the race are fine physical appearance and development, amiable disposition, and a smiling, light-hearted demeanor. The men are brave, but are inclined to be indolent; the women are well developed and handsome, with a distinct resemblance to the Chinese type, amiable, faithful, and very industrious. More than 90 per cent of the population lives east of the Paraguay River.

GOVERNMENT

Paraguay is a Republic with a constitution, like other South American constitutions, copied after that of the United States. The president is elected for a term of four years and is reeligible only after eight consecutive years. In other respects the constitution follows closely that of the United States. The National Government has a few executive departments with a minister in charge of each. The statistical organization is in the Department of Hacienda (Treasury). The Bureau of Agricultural Statistics has a small force of employees who copy into registers various data of a statistical nature that come to them weekly, monthly, quarterly, and annually from the customhouses, schools, prisons, etc. The official hours of labor are from 8 to 11 a. m.

The country is divided into departments, each of which is divided into partidos (counties) and companias (townships). Each department has a capital, each partido a principal town, and each compania a town or village. This is the basis of a semimilitary organization of police and instruction.

East of the Paraguay River the country is divided into 12 departments and a capital district. The population of these departments varies from 26,000 to 176,000. In 1920 the capital, Asunción, had 99,836; Villarrica, 26,000; Encarnacion, 12,500; and other cities ranging from 2,500 to 14,000 inhabitants each. The Chaco, west of the river, is divided into four military departments with an estimated population of about 70,000, of which about 50,000 are Indians.

The official language of the government, of the schools, of the press, and of educated people, is Spanish, but the common language spoken by people in the country is Guarani, which is said to be very difficult to learn.

LAND SUITABLE FOR AGRICULTURE

Of the total land area, amounting to approximately 113,000,000 acres, it is estimated that about 50 per cent is open country, 42 per cent is woodland, 2 per cent is mountainous, and 6 per cent is river, lake, and swamp. A careful study of maps and descriptions of the country, together with some personal observation, leads to the estimate that about 44 per cent of the total area, or, say, 50,000,000 acres, is suitable for cultivation and livestock raising.

THE AGRICULTURAL BANK

The Banco Agricola de la Nacion is the most active institution in the country for encouraging agricultural development. It is authorized to make loans to producers and to finance harvesting and selling of crops. It has agents in most of the cities and towns and a small force of inspectors who also act as agricultural agents. It has a division called "Division de Defensa Agricola," which is the only organized agency for distributing seeds, for publishing cultural instructions, for encouraging the cultivation of new crops or better varieties of old crops, for combating insect pests and plant diseases, and for collecting agricultural statistics. It is in charge of Guillermo Tell Bertoni, the son of Moises S. Bertoni, a Swiss who has lived in the country for many years and who has written extensively concerning the geography, topography, climate, flora, and fauna of Paraguay.

THE BOTANICAL GARDEN

The Jardin Botanico was formerly an agricultural school, but because of lack of interest and support it was recently turned into a botanical garden. The garden has 450 hectares (a little more than 1,100 acres), good buildings and equipment, many acres of ornamental grounds, including a good collection of roses. It has considerable areas planted to coffee, yerba mate, and other plants and crops of economic importance suitable for the climate, and several hundred acres of native trees, shrubs, and plants make it very valuable. It is about 5 miles from Asunción and can be reached by a good road.

PRODUCTION OF PRINCIPAL CROPS[20]

COTTON

The high price prevailing for cotton during recent years has resulted in great interest in the production of cotton in Paraguay. Both the Government, through the Banco Agricola del Paraguay, and private concerns are giving every encouragement to its development. Cotton growing in Paraguay has scarcely progressed beyond the initial stage, but it has been estimated that more than 22,000,000 acres can be so utilized eventually. A preliminary estimate places the area cultivated in cotton during the 1924–25 season at 35,000 acres. This figure shows a slight decrease in comparison with the 42,000 acres in cultivation during 1923–24, but the area is still about four

[20] Detailed estimates published in Banco agrícola del Paraguay, Asunción. Memoria . . . correspondiente al año 1923 . . . Asunción, La Colmena S. A., 1924.

times that of the next highest year, 1922–23, when only 9,790 acres were under cultivation. In 1916–17 only 120 acres were in cotton.

The principal advantages possessed by Paraguay for the production of cotton are favorable climate and soil, and cheap and plentiful land and labor. It can be grown anywhere in the country except on the mountains and wet areas along rivers and streams.

The principal disadvantages are distance from markets and inadequate transportation facilities and high freight rates; lack of modern agricultural equipment; lack of gins; lack of an organized market; lack of selected varieties of cotton with a uniform length of staple; promiscuous intermixture of varieties with a consequent deterioration in the quality of the staple produced; low cost of living, which affords small incentive for work; competition with other crops, such as yerba mate, tobacco, sugar, and rice, the first two particularly commanding a steady market at remunerative prices; mountains and woods east of the Paraguay River, and swamps, woods, deficient rainfall, and lack of potable water in some regions west of the river. Insects are numerous and seem to thrive in the country. It appears to be only a question of time before the boll weevil and pink bollworm will be widespread.

Cotton planting in Paraguay generally begins the latter part of August or early September and continues until December, although the best time for upland cotton is said to be between October 15 and November 15. The picking season begins in January and ends in May. Generally there are three pickings, the first in January, the second in March, and the third ending in May.

Very little native cotton is cultivated. The only cotton grown on a commercial scale is a number of varieties of the upland type, about 98 per cent of the total, but these are badly mixed. They are derived from seed of the Petertin, Hawkins, Allen, and Georgia varieties introduced many years ago. The staple is said to have been classified by a cotton firm in Barcelona as Good Middling and Fully Good Middling. In 1920 samples were sent to the Paraguayan consul in London and were classified in Liverpool as "more or less equal to Good Middling." There is great diversity in the length of staple even in a single field, and the only attempt at grading is by degree of maturity, color, and freedom from trash and discoloration.

One of the major difficulties in the development of the cotton growing industry in Paraguay at present is the lack of homogeneity in the product grown as a result of the promiscuous intermixture of varieties and the lack of proper attention to the selection of seed. More than 34 varieties of cotton, mostly American and Egyptian, have been planted during the past 25 years.

The promiscuous planting of different varieties has led to a rapid intermixture through the medium of insects and other factors until there is no such thing as a named variety or grading by length of staple. There are no clearly defined sections in which certain varieties are grown. The same mongrel variety is grown wherever cotton is produced.

Modern farming implements are little used, the common tools being crude plows, harrows, and hoes. It should be distinctly understood that the areas cultivated in cotton are very small, usually little more than garden patches. Producing cotton is conducted as

a family affair. The largest single area in cotton in Paraguay in 1923–24 was less than 50 acres in extent. Usually the ground is plowed and harrowed once before planting. Occasionally this is done in July or August, and a crop of beans is grown and turned under before the cotton is planted. From 7 to 15 pounds of seed are used per acre, depending upon the fertility of the soil. The seed is planted by hand, either in open furrows or in holes made with a hoe.

When the plants are from 3 to 5 inches high they are thinned to 3 or 4 plants in a hill, and about 2 weeks later they are again thinned to 1 or 2 plants in a hill. The rows are usually from 3 to 3½ feet apart, and the hills are left from 18 to 36 inches apart in the row. After thinning the larger fields are given from one to three shallow cultivations with a plow, as may be necessary to keep them clear of weeds. The small fields are kept clean with the hoe, without the use of plow or cultivator.

The small scale on which cotton production is conducted results in there being no special provisions for financing the production of the crop other than the extension of credit on a small scale by the country stores and dealers. As a matter of fact, the production of cotton and tobacco in Paraguay at present is about on the same scale and footing as on the isolated mountain farms of Georgia half a century ago.

No commercial fertilizers are used in Paraguay. The soil is generally deficient in lime and no doubt commercial fertilizers could be used to good advantage. The soil is sandy in many localities. Much of the land in cultivation has been cropped to tobacco and garden vegetables for many years. None of the land is irrigated. Irrigation is unnecessary east of the Paraguay River, but is needed in portions of the Chaco region west of the river.

Land is cheap in Paraguay. Prices east of the river for land under fence, suitable for plowing, and land in cultivation in the mountain region ranges from $3.50 to $7.50 per acre, equivalent to from 475 to 1,000 pesos per hectare. In the central region it ranges from $4.50 to $7.50 per acre. In the south the price is generally about $7.50 per acre. West of the Paraguay River, in the Chaco region, very little of the land is improved. For unimproved land, either prairie or covered with a good growth of timber, the price ranges from a few cents up to $1.50 per acre.

Should prices for cotton remain at a sufficiently high level, Paraguayan farmers would no doubt be induced to give greater preference to that crop. A great expansion of the industry, however, would call for a great increase in population, not only by the slow process of natural growth but also by immigration, in order to furnish the type and supply of labor needed.

Table 55, published in the annual report of the Banco Agricola del Paraguay for 1923, gives the average daily and monthly wages paid to agricultural laborers in the different regions of Paraguay during 1923, conversions to United States currency having been made at the average value of the Paraguayan peso for 1923, which was $0.018.

TABLE 55.—*Labor: Average wage for agricultural laborers in Paraguay*

DAILY

Region	April	May	June	July	August	September	October	November	December
Cordillera	$0.078	$0.066	$0.055	$0.055	$0.055	$0.070	$0.070	$0.074	$0.081
Central	.10	.10	.106	.107	.085	.089	.118	.122	.118
Sud	.089	.089	.089	.089	.089	.089	.089	-------	.089
Guaira	.10	-------	-------	-------	.092	.092	.074	.092	.074
Misiones	.148	.148	.185	.148	.111	.148	.148	.148	.148

MONTHLY

Cordillera	$2.15	$1.67	$1.11	$1.11	$1.11	$1.86	$1.86	$1.98	$1.98
Central	2.23	2.35	2.35	2.42	2.47	1.67	2.79	2.69	2.69
Sud	1.86	1.86	1.86	1.86	1.86	1.86	1.86	-------	-------
Guaira	2.42	-------	-------	-------	2.42	2.23	1.49	2.42	2.42
Misiones	1.49	1.86	1.11	1.49	1.49	1.11	1.49	1.49	1.49

After the cotton is picked it is exposed to the sun an hour or more on tarpaulins or wire screens for drying and then sorted into two grades, namely, firsts and seconds. Sometimes the grading is done at the time of picking, the picker carrying two bags for that purpose. Into the first grade go the clean, white, well-opened bolls, and into the second grade the defective bolls, immature bolls that have not fully opened, and bolls that are stained or colored. Very dirty bolls that are badly stained or colored can not be included in the first or second grades. Where there is a sufficient quantity they are separated into a third grade.

The cotton is sold in the seed by the grower and is ginned and baled by the buyer and put up in bales of approximately 250 pounds or of 500 pounds, gross weight, the bagging and ties weighing approximately 22½ pounds. There are no compresses in the country. The bagging is a much finer quality burlap than that used in the United States and entirely covers the bales, making a package far superior in appearance to the bales commonly seen in the United States. Samples are taken in the usual manner, by slashing a short cut in the bagging and extracting the sample of lint. As a matter of fact, very few bales were seen that had been cut for samples and then only in one place. The practice of butchering cotton bales for samples does not prevail in Paraguay.

The method of marketing by cotton growers, as described by Senor Bertoni, of the National Agricultural Bank, is about as follows: The cotton is picked, sorted, dried, packed in burlap bags and stored in the grower's shed. Usually the grower expects to obtain a higher price by holding his product as long as possible. When he is in need of money, his wife or grown daughter takes a bag of cotton to the nearest buyer, usually an agent of the National Agricultural Bank, or a storekeeper in the nearest town.

There is no standardization of cotton in Paraguay beyond the sorting of seed cotton at picking time. One of the obstacles that appears to be almost insuperable to the standardization of fiber

under the present system is the fact that the cotton picked from different fields is sold a bag at a time and is mixed with others at the gin, so that a single bale may contain cotton from many different fields. Furthermore, there is the greatest lack of uniformity in the fiber grown in a single field. Two plants growing side by side may show a difference of half an inch or more in the length of staple.

The only two trade terms in use are those that refer to cleanness, whiteness, and color of fiber, and not to its length or uniformity. These are known as first and second grades of quality.

Before cotton production in Paraguay can be developed into a large export business the existing transportation facilities by rail and water from the best cotton-producing areas to the chief markets must be extended and improved. Water transportation is available for 400 miles along the Paraguay River, for 300 miles along the Pilcomayo River, and for 450 miles along the upper Parana. The present railroad mileage does not exceed 250 miles. The existing transportation facilities, however, could accommodate many times the present production.

It is rumored that the boll weevil was introduced into Paraguay in a lot of North American cottonseed imported by a commercial firm in 1923, but this rumor is not confirmed. Probably the worst insect enemies of cotton in Paraguay at present are the innumerable leaf-cutting ants and the army worm. Locusts, which often entirely destroy young cotton in Argentina, do not seem to be a serious pest in Paraguay.

The strongest factor for the development of cotton growing in Paraguay is the price received by the grower. The only official agency promoting the culture of cotton is the Seccion Defensa Agricola of the Banco Agricola del Paraguay. No other agency is systematically promoting the industry, although there is a general sentiment in favor of increasing the production of this crop because of the high prices realized during recent years.

Under the law, the Seccion Defensa Agricola of the Agricultural Bank has organized a committee in each agricultural county, which collects data with respect to areas, yields and production of the various crops grown. The local representatives of the bank are usually members of these local committees. Also, the traveling field inspectors of the bank serve as field agents to check up and supplement the information supplied by the local committees. These committees report to the Seccion Defensa Agricolo after the planting season as to the area planted, and after harvest as to the average yields, production, and prices. Regular crop reports are not issued, but from time to time information is published through the press, and after the close of the crop year an annual report is prepared. The report for 1923 was in the hands of the printer in August, 1924.

Table 56, compiled from statistics furnished by the Banco Agricola, gives the area and production of cotton in Paraguay during the past nine years. The figures on the yield per acre are simply the statistical averages based on the acreage and production figures given by the Banco Agricola.

TABLE 56.—*Cotton: Production in Paraguay, 1916–17 to 1924–25, inclusive*

Year	Area	Yield per acre of lint	Production of lint	Percentage of increase over previous year
	Acres	*Pounds*	*Bales* [1]	*Per cent*
1916–17	120	366.5	90	
1917–18	490	170.7	175	94
1918–19	803	179.8	302	73
1919–20	2,000	212.9	891	195
1920–21	2,483	184.4	958	8
1921–22	4,497	278.1	2,616	173
1922–23	9,790	285.6	5,844	123
1923–24	42,000	183.2	16,100	175
1924–25 [2]	35,000	177.5	13,000	−19

[1] Of 478 pounds. [2] Preliminary.

Spinning in Paraguay is done entirely by hand. It is estimated that approximately 33 short tons of ginned cotton are used in the country annually for spinning by hand. The total number of gins in the country is given as 12. These are said to be of old design and badly worn.

Exports of cotton from Paraguay from 1918 to 1923 in bales of 478 pounds net weight are given in Table 57. Most of these exports went to France, England, and Germany through commission merchants in Buenos Aires. Asunción, Encarnacion, and Concepcion are the concentration points for assembling cotton for export.

TABLES 57.—*Cotton exports from Paraguay from 1918–1923 in bales of 478 pounds net weight*

Year	Bales	Year	Bales	Year	Bales
1918	36	1920	775	1922	2,478
1919	163	1921	773	1923	4,216

The portion of the cottonseed crop not used for seed is exported. None is used for any other purpose in Paraguay. The statistical office reports that in the 12 months ended July 31, 1924, about 4,300 short tons of cottonseed were exported. Exports in previous years were insignificant.

The prospects for the immediate expansion of cotton production in Paraguay are excellent. The last cotton crop brought considerable money into the country and increased the purchasing power of small producers, greatly exciting their imagination. The result will be, undoubtedly, a considerable expansion in the area planted to cotton in the coming season, estimated by various persons in Paraguay at as much as 250 per cent over that of last year.

Continuous expansion will depend altogether upon the price of cotton, and whether that price will enable it to compete with yerba mate, tobacco, and other products. The conditions for cotton growing are highly favorable, with land plentiful and very cheap, labor cheap and adequate for a considerable immediate expansion, and the

climate comparable to that in sections of the cotton-growing States of the United States. East of the Paraguay River the country is about like Georgia and Alabama for soil and topography and the climate is similar to that of Florida. West of the river in the Chaco there are, large tracts resembling the Gulf coast region of Texas.

It should be noted, however, that while the climate and soil are favorable to cotton growing, they also provide a simple living with less labor than is involved in cotton culture. It has also been shown that the factors inhibiting cotton production are numerous and that much work is required to put the industry on a real commercial basis. The country is far from seaports, transportation is expensive, and there is little domestic market except for such products as yerba maté, tobacco, and a few other products which command a steady market at remunerative prices.

TOBACCO

The area planted to tobacco increased from 16,500 acres in 1914 to 32,700 acres in 1923, the average for the last eight years being about 28,500 acres. The average yield from 1914 to 1923 was 947 pounds per acre and the average annual production about 25,000,000 pounds, of which about 16,000,000 pounds were exported.

RICE

In 1914 the area in rice was about 1,112 acres. This increased to 3,700 acres in 1918, but decreased to about 2,360 acres in 1921, 1922, and 1923. The average yield for the 10 years, 1914 to 1923, was 1,870 pounds per acre and the average annual production the last 5 years was about 4,777,000 pounds. Paraguay has no export trade in rice, but imports on the average about 1,073,000 pounds.

PEANUTS

For the 10-year period, 1914 to 1923, the average area in peanuts was about 12,000 acres, the yield about 1,730 pounds per acre, and total production about 20,800,000 pounds. Exports varied greatly. In the year 1916 there were 4,799,000 pounds, but in the year 1920 there were no exports. Exports amounted to 31,300 pounds in 1923.

CORN

Except for one year, 1917, the area planted to corn increased steadily from about 62,000 acres in 1914 to about 105,000 acres in 1923. The average yield for the same period was 18 bushels per acre. The total production in 1923 was estimated to be about 2,283,000 bushels. No corn is exported.

SUGAR

The area planted to sugar cane increased from 12,300 acres in 1914 to 20,200 in 1919, and decreased to about 12,325 acres in 1923. The production of sugar has varied from 562 tons in 1919 to 2,559 tons in 1914, 2,406 tons in 1922 and 1,748 tons in 1923. Imports varied from 1,825 tons in 1914 to 2,559 tons in 1919, falling to 123 tons in 1923. Normally, Paraguay does not export sugar, although in 1920, 1,410 tons were exported.

COFFEE

The area planted to coffee in Paraguay has averaged about 500 acres and the production about 222,000 pounds during the last 10 years. Imports averaged about 307,000 pounds annually from 1918 to 1923, so that Paraguay produces about 42 per cent of her coffee requirements.

YERBA MATÉ

Yerba maté (*Ilex paraguayensis*) is not yet cultivated to any great extent in Paraguay, as the crop is mainly gathered from wild trees. The annual production averaged 19,367,000 pounds for the 10 years, 1914 to 1923, and the average exports during this period were 9,319,000 pounds, or 48 per cent of the total quantity produced.

LIVESTOCK [21]

Any consideration of livestock in Paraguay must be confined chiefly to the cattle industry. Other livestock—hogs, sheep, and horses—are of minor importance. They are few in number and of poor quality and few if any attempts have been made to improve the native stock. But cattle raising is the most important single industry in the Republic and one which is capable of still greater expansion with the opening up of new lands and the improvement of transportation conditions.

According to the best available estimates, there were approximately 4,300,000 head of cattle in Paraguay at the end of 1924, as compared with 4,000,000 in 1923 and about 5,000,000 in 1915. Cattle are found in all sections of the country wherever land is available for grazing, but three areas are particularly adapted to cattle production. The first of these regions is the Misiones, in the southern part of the country, a triangular area bounded by the Paraguay and Parana Rivers and by a chain of low hills running southeast from a point a little south of Asunción. The second region is in the extreme north of the country extending north from the Ipane River and the town of Concepcion to the Brazilian border. The third area is the Chaco, the vast region west of the River Paraguay extending to the foothills of the Andes.

The first and second regions are well watered and have been devoted to cattle raising from a very early period in the history of the country. The Chaco, however, is a newly developed range area and even yet has been only sparsely settled and stocked. The western part of the Chaco is still unexplored and the boundary between Paraguay and Bolivia has never been definitely settled. The Chaco is largely prairie land with some forest. Near the Paraguay River there is plenty of water in lagoons and streams, but farther back in the country wells must be dug.

The native cattle of Paraguay are descendants of the old creole stock brought to the country in colonial times, some as early as 1546. They have been allowed to breed rather indiscriminately and with little attempt at improvement. Some 30 years ago Paraguayan cattlemen tried the experiment of introducing zebu stock from Brazil. The results were not satisfactory and efforts are now being made to

[21] This section of the report was prepared by G. B. L. Arner, Agricultural Statistician, in the Division of Statistical and Historical Research.

breed out the zebu blood. In 1903 the Sociedad Ganadera del Paraguay was organized by the leading stockmen of the Republic. This society aims to improve the breed of cattle, to combat pests and diseases, to protect the industry against unfair legislation, and in general to raise the standards and promote the interests of the industry. The most progressive cattlemen have imported purebred bulls, chiefly of Shorthorn and Hereford stock. The latter breed is generally preferred.

The World War, with its heavy demand for beef, greatly stimulated the cattle industry in Paraguay and led to renewed attempts to improve the stock. To meet the demand of the Argentine packing houses for canning beef, many thousands of Paraguayan cattle were driven to Argentina during the last years of the war, and three meat-canning factories were established in Paraguay by American capital. After the war the demand for canned beef fell off rapidly and all three packing houses closed down. For some time the only markets for cattle, aside from the domestic consumption of 100,000 to 150,000 head a year, were one or two small jerked-beef factories. The period of extreme depression which followed in the cattle industry was made worse by a civil war which caused severe losses to cattlemen.

In 1922 the packing plant at Zeballos-cué changed hands and resumed operations in May, 1923. This plant, with one jerked-meat factory which still continued to operate, gave a fairly good outlet for Paraguayan cattle during 1923. In 1924, however, the Liebig plant closed down because of lack of satisfactory transportation facilities. A new saladero or jerked-beef factory was reported in March, 1925, as nearing completion. Its capacity was given as 75,000 head of cattle yearly and it was expected that 20,000 head would be slaughtered in 1925.

The state of the livestock industries in Paraguay in the past four years is reflected in the exports of animal products as reported by the United States consul of Asunción (Table 58).

TABLE 58.—*Paraguay: Principal exports of animal products, calendar years 1921–1924*

Product	Unit	1921	1922	1923	1924
Cattle, live	Number	6,614	52	48	6
Jerked beef	Pound	1,771,599	3,425,005	2,933,622	1,019,901
Fat	do	226,157	773,953	2,758,466	3,490,799
Hair, bristles	do	153,985	212,153	234,338	
Hides, cattle, dry	Number	51,739	95,034	75,215	67,352
Hides, cattle, salted	do	139,154	204,485	252,463	270,970
Horns	Pound	113,305	514,984	509,457	224,810
Wool	do	7,414	51,563	45,329	118,407

The number of cattle slaughtered at the only important plant operating in 1922 was 22,624. In 1923 the combined slaughterings of the two packing plants in Paraguay was 69,892 and in 1924, 57,500. The production of animal by-products in these two establishments for the past three years is reported as in Table 59 by the United States consul.

TABLE 59.—*Paraguay: Production of animal by-products, calendar years 1922–1924*

Product	1922	1923	1924	Product	1922	1923	1924
	Pounds	*Pounds*	*Pounds*		*Pounds*	*Pounds*	*Pounds*
Meat extract		428,030	335,899	Tendons		31,658	19,863
Preserved tongues	20,860	65,622	23,408	Bladders		42,143	4,672
Preserved meat		1,530	31	Horns	40,316	118,319	41,687
Tallow	530,962	2,972,855	3,504,141	Hoofs		84,928	51,279
Jerked beef	3,513,085	3,682,083	769,683	Bones		223,106	56,409
Beef meal		1,704,286	1,379,242	Hair	2,676	7,418	

The greatest need of the Paraguayan cattle industry is the improvement of transportation facilities both within the country and to the seaboard. Better transportation would make it possible to market fresh meat abroad, which seems to be impossible at present, and would at the same time make it possible to market less perishable meat products to better advantage in competition with neighboring countries. So long as transportation conditions are as poor as at present there is little incentive for Paraguayan cattlemen to improve their stock or to expand the industry into the still less accessible Chaco region.

Thus while within the country the cattle industry is already of great importance, as far as the outside world is concerned, Paraguay is chiefly important as a great potential source of beef supplies which may be developed and drawn upon when the productive capacities of Argentina and Uruguay have been reached.

PRICES OF AGRICULTURAL PRODUCTS

Price data in Paraguay are not very satisfactory because of wide variations in quality and between different markets, as well as the fluctuating value of the peso. Expressed in currency of the United States, the peso has ranged in value from 1½ cents to 2½ cents in the two years, 1923 and 1924. If the peso be taken as equal to 2 cents, the range of prices in 1923 would be about as listed in Table 60.

TABLE 60.—*Range in price of various commodities in Paraguay, 1923*

Item	Unit	Price range		Item	Unit	Price range	
		Low	High			Low	High
Tobacco:		*Dollars*	*Dollars*			*Dollars*	*Dollars*
Pito (poorest)	Pound	0.025	0.038	Mares	Head	6.00	15.00
Para (best)	Pound	.082	.109	Mules	Head	16.00	33.00
Seed cotton (first class)	Pound	.044	.045	Sheep	Head	.60	3.00
Peanuts	Pound	.088	.238	Swine	Head	3.00	9.00
Corn	Bushel	.254	1.27	Lard	Pound	.046	.138
Beef cattle	Head	13.00	18.00	Mutton	Pound	.028	.046
Steers	Head	8.00	17.00	Plow land	Acre	2.40	[1] 8.12
Heifers	Head	5.00	12.00	Uncultivated land	Acre	.80	[1] 3.20
Cows	Head	4.00	17.00	Farm wages	Day	.15	.50
Horses	Head	10.00	24.00	Farm wages	Month	3.00	5.80

[1] East of Parana River; west of the river land is cheaper.

POTENTIAL AGRICULTURAL PRODUCTION

Paraguay has good soils, a semitropical climate, and abundant rainfall in the eastern two-thirds of the country. Of the total area less than one-fifth of 1 per cent has ever been cultivated, although approximately 58 per cent of the total area is prairie. Making due allowance for broken and heavily-wooded country, and for rivers, swamps, and semiarid regions not adapted to agriculture, it is believed that at least 32,000,000 acres of prairie and 18,000,000 acres of sparsely-wooded land, or a total of 50,000,000 acres, is well adapted to agricultural crops and livestock.

In other words, the crop areas and production of Paraguay can be readily increased many times whenever population, transportation, and marketing facilities are available. The crops most likely to be increased are cotton, tobacco, rice, sugar cane, corn, peanuts, mandioca, and citrus and tropical fruits. A considerable area will probably go into yerba maté groves, as the present production comes almost entirely from wild trees. The natural resources of the country are great and valuable, especially its well-watered fertile prairies and large areas of hardwood trees.

The principal drawbacks are lack of railways and good roads, distance to markets, and high freight rates, a sparse population, a hot-summer climate and many insect pests, primitive conditions of life and low standard of living, and lack of stability in the government. Except distance to markets and the hot-summer climate, most of these adverse conditions will greatly improve or disappear with increase of population, of production, and of prosperity. The present state of development and appearance of the country is similar to portions of the United States a century or more ago. To those who enjoy a primitive mode of life in an undeveloped country of great natural resources, Paraguay offers many attractions and opportunities.

SOURCES OF INFORMATION RELATING TO PARAGUAY

The Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C., for statistics of agriculture and livestock production, exports and imports, crop reports and economic data with respect to potential agricultural production.

The Bureau of Foreign and Domestic Commerce, United States Department of Commerce, Washington, D. C., for statistics of manufactures, trade and commerce.

The Consular Bureau, United States Department of State, Washington, D. C., for information concerning the laws and regulations governing immigration, travel, imports, tariffs, and business licenses.

The Pan American Union, Washington, D. C., for descriptive material, statistics, and general information concerning Paraguay.

The American consul, Asunción, Paraguay, for the latest information relative to any particular subject, industry, person, or business firm in Paraguay.

ORGANIZATION OF THE UNITED STATES DEPARTMENT OF AGRICULTURE

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